The Iron Age

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 83 Reade Street, New York. Entered at the Post Office, New York, as Second-Class Matter.

Vol. XXXI: No. 23. *New York, Thursday, June 7, 1883.* *$4.50 a Year, Including Postage. Single Copies, Ten Cents.*

Weak Points of Storage Batteries.

A correspondent of the Boston *Journal* has recently had an interview with an expert who was sent over to Europe during the winter, in behalf of a number of gentlemen who thought of investing in the stock of the New York company which holds the Faure patents, and which are supposed to be the bottom or foundation patents upon storage batteries. He writes as follows:

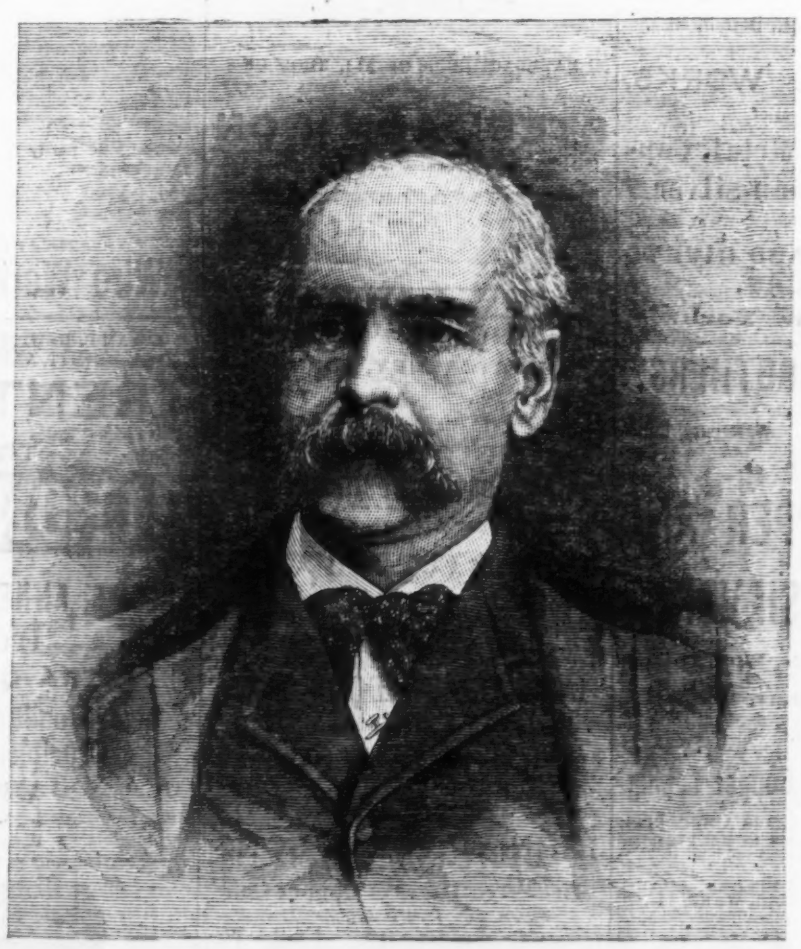
This gentleman went to London to find out what had been done over there with it in a practical way, and has just returned. He saw Siemens, the foremost English authority upon the subject; Lockyer, who is among the best English electricians; Preece, who is at the head of British telegraph lines, and besides consulting these scientific men of acknowledged position, he advertised for information regarding storage batteries and questioned all practical men who had anything to do with the matter. The result was to convince him that it would be unwise to risk money in the storage-battery business. At his request Lockyer went to Scotland to find out what Sir William Thomson's experience had been, for Sir William was among the first to give reputation to the storage battery. The story which the great investigator tells is not encouraging to investors in new scientific schemes. He has given more than a year to the study of the storage battery, and confesses that in its present condition it is useless as an economical apparatus. The trouble is that the batteries cannot be recharged more than four or five times; the lead plates disintegrate and fall to pieces after that and have to be renewed. The first result of experiments with storage batteries is to fill the experimenters with enthusiasm; then they find that there is a radical fault in the machine, but so fascinating is the affair that they say little about the snag they have struck, and work away, hoping to find the remedy. For instance, out of the hundreds of batteries which Sir William Thomson has constructed within the last year and a half, only three seem to stand any amount of recharging and discharging; the lead plates in these three remain intact, while all others have gone to pieces long ago. Why these particular batteries should stand and others should go to pieces Thomson has been unable to find out, although he has scarcely worked at anything else for the last year. He says that he will find out sooner or later what the peculiarity is, and when he does, the storage battery will enter the field of practical usefulness. Until then electricians must go with their experiments. Siemens talks in about the same vein, and acknowledges that the scientific world jumped at conclusions too hurriedly. Preece and Lockyer agree with these opinions, and the New York expert came back and presented a report which has stopped all negotiations for stock in the New York Faure Co. These views received corroboration to-day. I met Professor Barker, of the University of Pennsylvania, one of the best electricians in the country, and asked him if the storage battery was the great discovery which Brush and the Faure people had announced. Barker shrugged his shoulders and laughed. "The world went off at half-cock on this battery business," he said. "There is the germ of a grand discovery in it, but no one has got to it yet. The plates give out, and too much electricity has to be put into the battery in proportion to what you can get out of it to make it economical. For some purposes, when cost is of no importance, it may be used, but as to its being an apparatus for every-day use we are yet a long way off. I do not believe that Brush has anything of practical value. I was requested to examine his battery by some one who thought of putting money in the stock. I went up to the offices of the Brush Co. and asked to see the battery about which so much had been said. I was politely refused, there being a secret about the preparation of the plates, they said. I asked whether, if I hired one of their batteries for my own use, I could examine it. No, I was told, it would be locked with a heavy padlock, and I must sign an agreement not to meddle with it. That ended my investigation. I do not believe that any Brush batteries will be put upon the market, unless to influence the price of stock." Stephen D. Field, a practical electrician of excellent repute, who has done some good work for the Western Union Co., and a nephew of Cyrus and Dudley Field, is rather more outspoken than Professor Barker. "The whole thing," he said to me to-day, "is an attempt to make more money. The Brush lighting companies throughout the country are not making any profits; the parent company says to them: 'Here is the storage battery, which completes your arrangements, and will make your whole plant pay enormously; put in some more money and it is yours.' I have been at work at the battery for months, and have given it up. There is something there, but it has not been reduced to a practical shape." Professor Morton, of the Stevens Institute, in Hoboken, has been lecturing within the last week upon the beauties of the battery, but his enthusiasm is probably due to inexperience, for he has been experimenting with the Sellon-Volckmar battery, the same form which Siemens gave up. At any rate, compared with Professor Barker and the Englishman named, his opinion is of little value.

Mining operations that have been recommenced within the past few years on the western coast of Sardinia amply demonstrate that many of the old lead deposits in this region were worked in earlier periods. A striking evidence of this fact is afforded by a recent discovery in some of the old mines of antique miners' lamps consisting of baked clay. They are described as being similar in shape to some of the lamps now employed in Hungary, differing from them in some unimportant particulars only.

James Park, Jr.

We present herewith an admirable portrait of the late James Park, Jr., of Pittsburgh, engraved from a photograph made of him in Paris while on his last European tour. We have already given, in our issue of April 26, quite an extended notice of Mr. Park's life, but it may be well to epitomize it here and add one or two other incidents that have come to our knowledge since the writing of that article.

Mr. Park was born in Pittsburgh, January 11, 1820, and died at his residence in Allegheny on the 21st of April, 1883. He was, therefore, 63 years, 3 months and 10 days old. Mr. Park was, both on his father's and mother's side, of sturdy Scotch-Irish ancestry, which blood has had so much to do in shaping the fortunes and character of Western Pennsylvania—indeed, which has had so much to do with shaping the character of our nation. Mr. Park began business in 1837, in the queensware department of his father's business. At that time his father was engaged in the wholesale metal, grocery and queensware trade. In 1843, on the death of his father, the firm of Jas. Park, Jr., & Co. was formed, the grocery and queensware trade dropped, and the metal trade continued. A copper rolling mill was built on part of the present location of the Black Diamond Steel Works. The copper firm in time became Park, McCurdy & Co., and later, Park, Scott & Co., which is the present title. In the year 1862 Mr. Park established the Black Diamond Steel Works, and commenced the manufacture of crucible steel. Under his intelligent management this works has grown until now it has the largest capacity for crucible steel of any works in the world, and its product in quality is second to none. Mr. Park was also at one time interested in the manufacture of cotton goods at the Banner Cotton Mill, in Allegheny, and in the manufacture of iron pipe at the National Foundry, in Pittsburgh. He was, at his death, one of the managers of McIntosh, Hemphill & Co., and was also largely interested in the Bessemer Steel Co., Limited, of Pittsburgh. He was one of the parties to originally introduce the pneumatic process into this country, having formed a part of the Pneumatic Association that owned the Keely, Mushet and Bessemer patents.



JAMES PARK, JR.—DIED APRIL 21, 1883.

As was noticed in our previous article, Mr. Park for years paid close attention to tariff subjects, and has been constantly found at Washington in the interest of American manufacturers whenever matters relating to the tariff on iron or steel were under consideration. He was an earnest worker, as well as contributor, in connection with the various benevolent, educational and moral enterprises of Pittsburgh. He was an incorporator and director of the West Penn Hospital, a director of the Western University, and a liberal contributor to the establishment of the Holly Tree Inns in Pittsburgh. During the war he was very active in the equipment of troops, and was one of three persons in Pittsburgh to originate and become responsible for the success of the great Sanitary Fair held in that city, the proceeds from which not only largely assisted in caring for our troops during the war, but the surplus helped to found and endow the West Penn and Dixmont Hospitals. He was a good man, a public-spirited citizen, and a friend of all worthy and proper undertakings seeking the welfare of society. He is widely and sincerely mourned.

Rapid Formation of Mineral Veins.—Dr. Fleitmann has lately remarked that the formation of mineral veins is far from requiring the length of time generally supposed to be necessary. About two years ago he filled up a trench with common clay containing iron, and having occasion to again clear this trench he found, to his great surprise, that the clay had entirely changed its character and had become white, while at the same time it was traversed in several directions by fissures one-twenty-fifth to one-sixteenth of an inch thick, which were filled with compact iron pyrites. Dr. Fleitmann supposes that the oxide of iron contained in the clay, coming in contact with water impregnated with sulphate of ammonia, became transformed into sulphate of iron.

Foreign Adulteration of American Products.

Consul Tanner in a recent report clearly exposes a number of the different methods adopted in some foreign countries tending to create a prejudice against American products. We quote as follows:

There are no people who cry out more lustily and energetically against adulterations than the Germans and Austrians, and yet there are none who indulge in such practices more extensively. Were the full extent of the talents displayed by these nations in adulterations turned into more honest researches, the benefits that would doubtless accrue to them and to science would be hard to define. They can take (and they do it, too) one gallon of our kerosene oil and make one and a half gallons out of it. If you go into a shop in Germany where this kerosene is peddled you will be surprised to find the oil, which you have already regarded as possessing but one grade, transformed by the Germans into three grades, and gravely told, when you manifest surprise, that it came from America that way. The first quality will be found slightly dashed, the second considerably so, and the third so heavily as hardly to be detected by its oldest and most intimate acquaintance. The science of dilution is carried into everything that is liquid, and adulterations into everything that is solid. Their wines, liquors and beers, their medicines, and even their mineral waters, are full of all kinds of concoctions and foreign ingredients that are dangerous to life and health. Their sausages and hashed meats are of a *mélange* of doubtful ingredients. Even their woolen goods are adulterated with wool made from rags; the rags are passed through a machine, reconverted into wool, then made into cloth and largely exported into the United States. It is well known and abundantly proven that cloth made from such wool retains through all its transformations and rough handling germs of disease, and disseminates them broadcast. A German dying of small-pox, his clothing becomes useless for other purposes than old rags. The American wearing a suit of clothes made of German cloth thinks little of the risk he is running, or of the condition of the person who has died, or worn at least a part of his suit before him. One must shut his eyes and go it blind when he makes up his mind to buy much that is brewed, baked or manufactured in Germany, and to be at that reckless point that he does not care what may happen. The adulterations of his cloth do not stop here. They sandwich in with the wool of rags, and a small proportion of pure wool, a new fiber known as Cosmos, just brought into use as an adulterant, and which is considered by recent investigation to be injurious to health. I have been told by a medical gentleman from Verviers that cloth in which this Cosmos existed, if placed in proximity to a young child, the parts touched thereby would become inflamed, and that it would produce eruptions if it came in contact with the mouth of the child. It is no secret that this article enters largely into the manufacture of woolen cloth in Germany and Austria.

Our flour, when found in these countries, becomes foreign to such an extent as to be beyond recognition. An examination of this article will show many adulterations that could not possibly have taken place in the United States, because these ingredients would be more costly with us than the genuine article of the same grade. These ingredients are numerous. I will only mention a few of them: Plaster-of-paris, baryta and potato flour. Bread made from this flour is also adulterated. Our lard is also doctored in many ways, tallow and horse fat being the most conspicuous adulterations. If evil consequences follow from such wholesale adulterations (as often happens), there is always a means of escape, and the German loses no time in availing himself of it; he sings out lustily that it is the consequence of American adulterations. There are some things that are so audacious in their character that they puzzle us to know how to treat them, whether grave or gay, and this charge of poison and adulteration coming from such a source is one of these things. It is the clever device of the juggler, who diverts the eye while he cunningly performs the trick. The charge that our flour, lard and other products that we export to those countries are adultered is palpably false and absurd. Is it probable that we would use adulterations which would cost us more than the genuine article, or would betray itself at first glance? Is it not reasonable to suppose that where those adulterations are found in a country in which the adulterating article is cheaper than the genuine article (to say nothing of a common practice) that the adulteration took place in that country?

The United States export many times the quantity of necessaries of life into England that we to do Germany. Belgium and other countries remain steady consumers of our pork and flour, and never a word was uttered against either until Germany commenced it. The case is simply this: When our products come into competition with the German home products, the latter suffer considerably, and in proportion to the magnitude of the former, the cry is raised of "American invasion." It is treated, too, as a real invasion, and all the unfair methods known to warfare are resorted to. If a choice was left with the German he would naturally prefer buying an article that he could get at the lowest price, and a Government that would try to force a dearer article on him would meet with opposition, and would be unpopular. In order to do away with this and to carry out a made-up programme of prohibition, a prejudice must be created against the cheaper article, and hence the song of adulteration, poison, and a copy of other falsehoods, are raised. It has been proven by experience that protection is not popular in Germany, nor would prohibition be unless the public mind had been worked up to a state to receive it. The first act in this programme has been shrewdly executed, and our pork has been driven in disgrace out of Germany by an order of His Majesty the Emperor. Emboldened by his success, the German now turns his attention to the next thing in order, our flour, and its fate is not hard to predict.

The same methods have been resorted to, the same prelude executed and the same results will follow with this article as with pork. These things, when allowed to go without protest, injure us more than would at first glance appear. These sensational stories of deaths by the wholesale, caused by American adulterations, go from one country to the other with astonishing rapidity, and are accepted as facts, to the great detriment of our commerce, besides creating an impression abroad that there is nothing so monstrous as an American. Our Government, with commendable energy, met the charge brought against our pork, and, at no little trouble and expense, instituted an investigation that resulted in a complete vindication of our hog; but this did not have the effect it was intended it should have, because the edict of prohibition was issued some time subsequent to its publication. It seems to me that if Germany can prohibit the importation of our products on a trumped-up and foundationless charge, that we could return the compliment on their woolen goods and other articles, on reasons that can be proven against them by any fair investigation, and in that way bring them to see and repair the injustice they are doing us. If some means are not devised to check this unjust and shameful war on our industries, one after another of our productions will fall as did our pork. If the effects of this war were felt in but one country, we might allow these things to pass, but this is not the case. Any one who will look at statistics will see that the German war against our pork has injured its importation into all other European States. Apart from a commercial view and other considerations mentioned, no one can be so amiable in disposition as not to smart under a system of injustice so doggedly followed up, to say nothing of the methods used.

Mistakes in the Use of Gaseous Fuel.

It is simply impossible, with the present decided tendency toward the use of gaseous fuel in new directions, that there should not be mishaps and mistakes in handling it. Some men to whom the care of the apparatus may be intrusted do not know the possibilities of such errors, and will have no one to inform them; some will be told carefully, but will be incredulous and will forget; others will listen to explanation, but will think, even if they do not say, that they understand the whole situation perfectly, and hence, needing no instructions, will listen to none, however great their ignorance. It is rather hard to say which of these classes is most to be feared, or least to be desired, if an owner must endure one or the other of them. It is almost certain, however, that either would be better for one of the modern forced-blast producers than any of the older, hide-bound type of gas men, who have laid some heavy burdens in years past upon iron and steel manufacturers in their handling of their producers. These men have too often stood directly in their own light by coolly ignoring the very best suggestions, tending many times toward a real lightening of their own labor, through an undefined fear, no doubt, at times, that a lightening of labor, or the bringing into play of a little more real skill, would eventually lead to a loss in wages.

It is more than likely that in this new departure the best men will be drawn from that large number, among whom selections can gradually be made, who are willing and "handy," this being taken to mean that unfeignable quality of catching the idea of an order, and going at once, and instinctively to do the needful things to carry it out. Whether this be to shovel coal so as to leave all the fine dust behind, or to ease a fan-blower, or to dig out a tarry flue, it matters little or nothing, if the work is done, and done with real wit and readiness—qualities that are as helpful to a manager as the very highest technical skill and experience can be to him in other classes of his assistants or workmen.

Some of the newer users of gas fuel are annoyed and worried by the puffs and explosions that occur almost invariably when a new apparatus is breaking in. It is not surprising that this should be so, for few men enjoy the belching out into their face or into their well-kept workrooms of a great body of flame and smoke, especially when this may be accompanied with a substantial report, and perhaps followed by an underground rumbling apparently of the most threatening kind. These preliminary troubles very rarely last long, though they sometimes lead men to wish for a few days that they had never heard of such a thing as gas firing. They are like some other things in the conduct of a manufacturing business, giving temporary trouble, but are sometimes wrongly supposed to be more dangerous and more wholly unlike anything else than the facts in the case at all warrant. It will be very fortunate for all interested if the new gas-fuel methods for boilers and for some other kinds of heating do command, as they may and ought to, an entirely different class or grade of labor or attendance. The details of handling are becoming simplified, and the fatigue is lessened by the use of the newer fixtures, the apparatus being made more perfect as a machine, and all experience in such things tends to show that such changes are in the direct line of securing more skillful management at a given rate of wages, and hence more economical results.

The fires were recently lighted in the Victoria Furnace, at Goshen, Rockbridge County, Va. The furnace, which has been in process of construction since August, 1881, is 85 feet high and 20 feet in diameter at the bosh. It is supplied with Siemens-Cowper-Cochrane hot-blast stoves, and is also thoroughly equipped otherwise. The corporation owning this furnace is composed of English stockholders, organized as the Iron and Steel Works Association of Virginia, Limited.

SCIENTIFIC AND TECHNICAL.

The Effects of Explosions of Fire Damp in Mines.

Probably one of the most interesting objects exhibited at a recent gathering of the Royal Society, Great Britain, was an experimental illustration of the action of coal in a fine state of division in propagating and extending the effects of explosions of fire-damp in mines. The apparatus was contributed by Mr. W. Galloway, who was the first to point out that coal dust held in suspension in atmospheric air becomes in itself, when once ignited, an explosive—or, rather, highly inflammable—mixture. This character is not due to its being mixed with a certain proportion of fire-damp, although an explosion of fire damp may be the initial cause of the explosion of the coal-dust mixture, in a manner analogous to the small explosion of the fulminate in a percussion cap causing the greater explosion of the charge within a cannon, without in itself contributing to any serious extent to the force of that explosion. Previous writers, while recognizing the important part played by coal dust in increasing the energy of explosions in mines, attributed to it a chemical action between coal dust and fire-damp, by which a specially explosive mixture is produced, and upon this theory it must be assumed that throughout the whole course and ramifications of an explosion in the workings of a mine fire-damp must have been present. On the other hand, Mr. Galloway's hypothesis is that in a pit in which there are quantities of dry coal dust lying on the floors and ledges of the workings, a small explosion of fire-damp, which in itself would be altogether unimportant, may produce the most disastrous results, although until the explosion took place there was no explosive mixture which could account for such results. Mr. Galloway, who has devoted a great deal of attention to this important subject, demonstrated experimentally that in such a case the concussion and air disturbance produced by the initial explosion of fire-damp disturbs the coal dust lying on the floors and ledges within its reach, a large proportion of which must be in suspension in the air at the moment the flame reaches it. Coal in a state of such fine division and so separated is in a condition above all others to be readily decomposed by heat and converted into coal gas and coke dust, and being surrounded, as each particle is, by atmospheric air, an explosive mixture is produced and fired. This communicates the explosion to all parts of the workings under similar conditions, each length of working being started by the firing of the length behind, its own explosion acting as an initial impulse to the next length before it. The apparatus exhibited consisted of three principal parts: 1. A gas mixture for producing the explosive mixture for the initial explosion, corresponding to the escape of fire-damp into the working of a colliery; 2, a combustion or explosion chamber corresponding to the locus of the first initial explosion of fire-damp; and, 3, a long square tube of wood which can be charged with lycopodium or other inflammable powder, and corresponding to the gallery of a coal pit in which dry coal dust is lying about. The apparatus for producing the explosive mixture of gas and air consists of an ordinary argand gas-burner, vertically above which is a conical tube of sheet iron open to the atmosphere around the gas-burner at its lower extremity, and communicating with the explosion chamber above. The mixture of coal gas and atmospheric air is effected after the manner of a Bunsen burner. In order to demonstrate that the ultimate explosion which takes place in the long wooden tube is not the result of the firing of an admixture of coal gas, atmospheric air and lycopodium, Mr. Galloway has separated the explosion chamber from the powder tube by a diaphragm consisting of two or three thicknesses of oiled paper, which, being ruptured by the explosion, allow the flame to reach the particles of lycopodium powder which are floating in the air, having been thrown off the little shelves and floor of the box by the concussion of the first explosion. The tube is kept open throughout its length until just before the charge is ignited, so as to insure any possible leakage through the diaphragm being accumulated within the tube, and one side of the tube is furnished with glass windows, that the flame of the explosion may be seen as it rushes along the tube to the outer air, the free end being conducted through an open window. While the explosion chamber is being filled with the explosive mixture of gas and air, the igniting orifice at the top is closed with a piece of wire gauze, through which, as the mixture escapes, it burns outside with a pale-blue flame that cannot communicate its heat to the gas within the chamber on account of the gauze which separates them. Upon removing the gauze the explosion immediately takes place, and this is followed by a lightning flash along the tube on its way to the outer air, which can be seen through the glass windows provided for that purpose.

The Influence of Surface Condensed Gas upon the Action of the Microphone.

Referring to the experiments of Mr. I. Probert and Mr. A. W. Soward on the influence of surface condensed gas upon the action of the microphone, recently mentioned in our columns, the following more complete particulars will be found interesting. The gentlemen in question state that a study of the phenomenon of surface condensation of gases shows that every surface exposed to a gas is coated with a condensed layer of the same. The more readily the gas is liquefiable by pressure the greater is the quantity condensed, and in the case of the very readily liquefiable gases the exposed surface is actually coated with a layer of liquid. In order to test the influence of this coating upon the action of the microphone, experiments were made with the instrument in different gases, such as hydrogen, carbon dioxide, wet air and dry air, and the method adopted in the experiments was as follows: A microphone of a well-known pattern, consisting of a glass tube containing cylindrical carbon blocks and having many contact surfaces, was attached to the inside of a clock-case and placed in circuit with a Hughes audiometer, a Morse key and three Leclanché cells. The carbon blocks of the microphone were pressed well together, so as to avoid as far as possible alteration of contact due to chance vibrations. A current of air, dried by passage over pumice-stone soaked in strong sulphuric acid and then over pent-oxide of phosphorus, was urged through the microphone for half an hour. The resistance of the microphone was then measured, and the point of the audiometer scale determined at which the beating of the clock became inaudible in the telephones. A current of similarly dried hydrogen was then passed through the microphone for half an hour, and the resistance again measured and the point of silence determined in the audiometer. The experiment was next repeated with carbon dioxide, the dried gas being passed through the microphone for a similar period; and, finally, for 15 minutes, a current of air was forced through water contained in Woulffe's bottle (in order to load the air with water vapor) and then through the microphone. The resistances and points of silence in the audiometer were determined as before. The results are expressed in the following table, and it may be noted that the scale of the audiometer was graduated from 0° in the center of 100°:

Name of Gas.	Resistance of microphone in ohms.	Point on scale of audiometer at which silence was reached.
Wet air	386	51°
Carbon dioxide	435	56°
Hydrogen	600	58°
Dry air	590	63°

It will be seen that the best result was obtained with wet air, which calculation shows should give a good conducting surface layer. Next in order is carbon dioxide, which, in the liquid state, is a moderate conductor. Hydrogen comes next, as would be expected, for neither it nor dry air is reducible to the liquid state by ordinary surface condensation, and the best result is to be looked for from the less condensable of the two—that is, hydrogen. The resistance of the hydrogen-charged microphone is, however, anomalous. In order to obtain our layers of condensed gas, it was considered sufficient to pass a stream of the desired gas over the microphone for some time, because it is known that when a piece of carbon charged with one gas is placed in an atmosphere of another, the two gases diffuse into one another with a result that the carbon remains charged with a mixture in the proportion indicated by multiplying their percentage volumes by their respective condensation coefficients. In the present experiments the quantity passed through the microphone in any one experiment was vastly greater than the residual gas from previous experiments. It was not attempted to rigorously exclude water in any of these experiments, since it has been shown that the last trace of water so obstinately clings to a surface that to perfectly dry a glass tube it must be raised to the softening point, and so kept for some hours while a stream of dry air is urged through it.

In these experiments with different gases there is a possible source of error which must not be overlooked. We have elsewhere shown (*Chemical News*, Vol. xlvii, p. 157) that the resistance of a porous piece of carbon is not a constant for a given temperature, but varies with the chemical nature and with the density of the gas with which the pores of the carbon are filled. It follows from this, that if a constant electromotive force be used, the current flowing and he sounds obtained will be altered by any alteration in the nature of the gas absorbed in the body of the microphone, irrespective of the contact surfaces. But the carbon used for the microphone here considered had very little absorptive power, and its resistance was practically constant at contact temperature. It is fair to infer from these experiments that the layer of condensed gas with which every microphone surface is covered is concerned to some extent in the regulation of microphonic action: As bearing upon the effect of a layer of moisture, the following experiment may be noticed: A common tin canister, joined through a rheotome to one pole of a four-cell Grove's battery, and held in the hand by an insulating handle, was pressed against the ear; a wire attached to the second pole of the battery was held against the tongue. Sounds were heard corresponding to the working of the rheotome, and a burning sensation was experienced at the ear, such as one might imagine would be produced by innumerable small electric discharges. Similar results were obtained with a 10-cell Daniell's battery (chamber pattern). The surface of the canister, which, having been exposed to the air, was coated, as all similarly exposed surfaces are, with an invisible layer of moisture, was then well wetted. The burning sensation became more marked, but the sounds of the make and break were no longer audible. It may be added that a solid brass ball, whether wet or dry, gave no sounds in the experiment.

The Thickness of Soap Bubble Films.

Professors Reinold and Rücker recently had occasion to show before the Royal Society, England, the apparatus devised by them for determining the thickness of a soap-bubble film after it has become so thin as to be incapable of reflecting light, and the colors due to thin films here give place to the black first observed by Sir Isaac Newton. In this apparatus a cylindrical soap bubble is blown between two metallic rings placed vertically the one above the other; these rings serve also as electrodes, by means of which a constant current of electricity can be transmitted through the bubble from top to bottom. When such a current is flowing (assuming the thickness of the bubble to be uniform and the specific resistance of the solution to be constant) lines of equal potential are horizontal circles drawn around the bubble, or, in other words, points in the film equally distant from (say) the positive electrode are at the same electrical potential, and the potential of any point in the film lowers as its distance from the positive electrode is increased. When the bubble is formed and adjusted, two fine platinum wires insulated from one another, but connected respectively to the terminals of a Thomson's reflecting electrometer, are brought by a little lever into contact with the cylindrical surface of the film, which they pierce without rupturing. The readings of the electrometer measure the difference of potential between

the two platinum points, and, therefore, of the equipotential circles of the cylindrical film with which they are respectively in contact. From these data Professors Reinold and Rücker, after having previously determined by careful measurements both the distance between the platinum points at which the current is "tapped," and the specific resistance of the solution of which the film is formed, were able to calculate the mean area of cross-section of the film between the equipotential circles—and, therefore, its thickness—and they are able to perform this delicate operation after the film has become so thin as to be perfectly incapable of reflecting light. The principal parts of this apparatus are inclosed in a glass case, by which dust and currents of air are excluded, and within which the atmosphere is kept saturated with moisture by means of a little endless roller blind or miniature "jack towel," the lower end of which passes over a roller immersed in solution, while by means of a rotary spindle the vertical evaporating surface of the web can be repeatedly renewed and kept in a wet condition.

The Transmission of Sound in Gases.

M. Neyreneuf, says *Engineering*, has communicated to the French Academy of Sciences the results of experiments made by him on the intensity of sonorous vibrations transmitted through different gases. He placed a sound source on one side of the gaseous chamber, and a sensitive flame on the other, and observed the action of the flame. The gases tested thus far are air, carbonic oxide, lighting gas and carbonic acid. Air and carbonic oxide have a transmissive power about equal. Air and lighting gas give very unequal results, probably because of the hydrogen in the latter. The results vary much with the chemical constitution of the coal gas employed. The transmissive power through carbonic acid is much greater than through air. The results show that Hauksbee's law is not correct, and the author is continuing his researches with a view of throwing further light on the dynamical theory of gases.

The Radiation of Silver in Solidifying.

At the International Congress of Electricians in 1881, M. J. Violle proposed, and M. Dumas, the famous chemist, seconded, the use of an absolute unit of light consisting of the radiation emitted by a square centimetre of platinum in melting. At the instance of M. Cochery, the French Minister of Posts and Telegraphs, an investigation of the subject has been begun by M. Vicllo, and his first experiments have led him to some observations on the radiation of silver in solidifying. A bath of pure melted silver was placed under a thermo-electric pile connected with a mirror galvanometer. The radiation from the bath fell normally on the battery through an aperture in a double-walled screen kept cool by circulating water. As the bath cooled the pile showed that the radiation slowly decreased until the instant just before solidifying, when there was a slight increase preceding the final decrease after solidification.

Moisture in Walls.

Dr. W. Hesse, a district medical official at Schwarzenberg, has communicated to the technical press of Germany a simple process for the quantitative definition of the free water which may be contained in a wall. For the carrying out of this process it is necessary to have a number of small glass flasks with glass stoppers. These should be of about ½ to ⅝ cubic inch capacity and of known weight. A small portion of mortar sufficient to fill one of the flasks is taken from the internal surface of the wall by boring with a tool specially constructed, and also by scraping from the wall, a piece of paper being held underneath. After the removal of any large unporous particles the flask is filled rapidly, and well closed with an india-rubber stopper. In the laboratory the flask itself, as well as the inner surface of the neck, is carefully dusted, the glass stopper is inserted and the flask weighed. It is then exposed in a drying-oven to a temperature of 212° to 230° F. until the mortar is completely dry, this process usually taking several hours. The flask is then allowed to cool in an apparatus specially designed for the purpose and is again weighed. By deducting the weight of the vessel (as previously ascertained) the difference between the weight of the mortar before and after drying is arrived at, and the percentage of moisture is thus established.

Tin Plate Manufacture.

BY MR. ERNEST TRUESHAW.*

This important branch of the iron and steel trades has not hitherto been brought under the notice of this Institute, for which reason the author has been induced to submit the present paper. There are but few records of the earlier history of the tinplate trade extant, and such as there are have been difficult of access. Until recently, indeed, there has been scarcely any information of a reliable nature obtainable, but in 1880 an able work† on the subject, compiled and arranged by Mr. P. W. Flower, of Neath, President of the Tin Plate Association, was issued to the public. The remarkable development of this industry and the magnitude it has now assumed are in themselves sufficient justification for briefly reviewing its history and detailing some of the special features of the manufacture; and the subject can scarcely fail to be of interest to the members of this Institute, many of whom are closely, if incidentally, affected by its growth and progress. Dr. Abraham Rees, in his "Cyclopædia of Arts, Sciences and Manufactures," published by Longmans in 1819, states that tin plates were first made in England by Andrew Tarranton in the year 1681. Mr. Flower gives 1665 as the date, which is more probably correct. Tarranton was sent to Bohemia by his employers to learn the art; but the manufacture was discontinued, and afterward was so much disregarded as to be considered one of the bubbles of the period. It was, however, again revived, and brought to such perfec-

* A paper recently read before the Iron and Steel Institute of Great Britain.
† "History of Tin and Tin Plate." By P. W. Flower; published by G. Bell & Sons, London, 1880.

tion about the year 1740 that very few plates were thenceforth imported. The home-made article was, indeed, of finer coat or gloss, being drawn through rolling mills instead of being hammered. The same authority states that tin plates were then known as lattins or lattens, a term which still survives in the galvanized sheet-iron trade. The manufacture was continued and developed principally in Monmouthshire, but it was not until our own time that the trade became really important. Its present dimensions may be appreciated by the fact that it consumes annually a quantity of pig iron approaching 500,000 tons, probably 1,000,000 tons of coal, about 10,000 tons of tin, and large quantities of sulphuric acid, palm oil and lead. It will be seen that such an industry must provide a vast amount of work for engineers, iron founders and others connected with the iron trade, in the form of new machinery and plant, as well as in its maintenance, and it will be inferred that employment is given to many thousand people as actual workers in the trade itself, and incidentally to large numbers in the various works, collieries, &c., which are affected by its requirements.

The chief seat of the industry, as most of you are aware, is South Wales and Monmouthshire, but there are important works also in Staffordshire, Worcestershire and elsewhere. The pig iron used by the manufacturers of tin-plate bars is obtained chiefly from Cumberland, the Forest of Dean, Scotland and Cleveland, in addition to which local pig irons are largely used, and on the judicious or injudicious blending of these various irons depends very largely the good or bad quality of the bars produced. It is unnecessary here to give any proportions in which the above irons are worked; each manufacturer has his own particular mixture, and some makers pride themselves upon the quality of the bars turned out by them, and enjoy a good reputation for their plates, and obtain higher prices in the market accordingly. No difficulty is experienced in procuring the coal required for coking purposes. Bituminous coal suitable for puddling and balling is plentiful in Glamorganshire and Monmouthshire, and steam coal is readily obtained. The tin consumed is brought principally from Australia, China and the islands of Banca and Billiton, and at the present time arrives in a state suitable for the priming of plates, but for a considerable time after foreign tin was first imported it was found necessary to refine it in this country. Formerly, Cornish tin was almost entirely used, but in consequence of the heavy cost of production it has been superseded in the market by that procured from the foregoing sources. Large quantities of sulphur are employed in making the sulphuric acid. It is chiefly imported from Sicily. Of late years Messrs. Vivian & Sons have manufactured large quantities of this acid from a material obtained from the gases which formerly escaped through their stacks in the process of copper-smelting at their works in South Wales. The palm oil used comes mainly from the West Coast of Africa. The following statistics will show the extension of the trade since 1858:

Year.	No. of mills.	Year.	No. of mills.
In 1858....	109	In 1880....	369
" 1868....	171	" 1881....	389*
" 1878....	218		

The following are the exports for stated years, in round numbers:

Year.	Cwt.	Year.	Cwt.
In 1862.....	1,000,000	In 1879.....	4,006,000
" 1872.....	2,400,000	" 1880.....	4,350,000
" 1878.....	3,100,000	" 1881.....	4,850,000

These figures, surprising as they are, only show the increase in the exports of tin and terne plates, and do not include the home consumption (about 1,250,000 cwt.), and large quantities of black plates, which are coated with tin at their destination, principally Russia, or used for japanning, button-making, and other purposes, principally in Paris. This traffic may now be estimated at 750,000 cwt.; but as black plates are classed with boiler plates and sheet iron in the Board of Trade returns, the quantity cannot be given with certainty. The total consumption of all kinds of plates for the past year may be computed at 6,850,000 boxes.

The manufacture of tin plates may be considered a specialty of this country, as the quantity now made abroad is comparatively unimportant. Plates are made to some extent in France and Germany, and attempts have been made to establish the manufacture in America, but with very limited success. Tin-plate works are of two kinds—those in which the bars are made and those in which they are bought. The former may again be subdivided into those in which charcoal bars only, those in which coke bars only, and those in which both, are made. Charcoal bars are manufactured by melting superior hematite pig iron in a coke fire with the aid of blast. The molten metal is then run into another fire in which charcoal is the fuel used, and is converted into wrought iron, which is hammered out and broken up or sheared into pieces, which are afterward heated in a hollow fire, coke being the fuel employed. These pieces are afterward hammered into slabs of a suitable size for rolling into bars. Coke tin plates are made from coke bars, so called, the pig iron being puddled in the ordinary puddling furnace, hammered, reheated and rolled into bars in the usual way. At some works patent puddling furnaces are used, but as yet they are not received with favor by either masters or men. The bars, whether charcoal or coke, are cut up into short lengths, which are heated to a dull red, passed through the mills, doubled, reheated and rolled until the required lengths and gauges are obtained. It will be of interest here to note that in early times the iron sheets were hammered out to the required thickness and size, and it was not until 1728 that mills were used for rolling the iron into sheets. Modern mills are capable of turning out about 500 cwt. per week, the day being divided into three shifts of eight hours each. The rolls used in the mills are known as "chilled rolls," the chill required being ⅝ inch to ¾ inch. The trade suffers considerably from want of rolls on which they can rely upon the evenness of the chill. The irregularity in chill and rapid changes in temperature are a source of much loss to manufacturers, as breakages are of frequent occurrence. If some member of this Institute were to discover a roll which would be less liable to fracture, and still preserve the necessary hardness of surface, he would be conferring a great benefit on the trade.

* It may be noted that about 30 of these mills are employed in making large sheets.

The sheets are taken from the mills to the shearer, who cuts them to the sizes required, and they are then separated by girls, weighed and passed on to the pickling department. Pickling is resorted to for the purpose of removing scale and other impurities from the surface of the sheets, and great improvements have been made in the method by which this is accomplished. In former times it was done by immersing them in sour water made from cereals, in vinegar, and more recently in muriatic acid and sulphuric acid, but some manufacturers are now using refined hydrochloric acid. Until very recently this was done entirely by hand, at great cost, and at great inconvenience to the workmen. Various patents have, within the last few years, been brought out with the view of doing this work by machinery, and, after numerous failures, several very excellent machines are now available, and are being generally adopted. In one of these machines from 10 to 12 boxes of plates are now pickled at a time, being deposited in cradles or racks, and moved up and down or to and fro in a bath of acid diluted with water. In one very simple and compact machine the movement of the cradles is effected by means of a single-acting cylinder fixed in the center of a cast-iron pillar, the cradles being attached to the piston-rod by flat steel-wire ropes working over sheaves placed on the top of the pillar. The steam-valve used in working the cradles is worked automatically by means of a lever and weight, the arms of which are struck by a tappet, so that in rising the steam is cut off, and in descending is let on, so confining the stroke to the required length. In about five minutes the plates are sufficiently clean, and the cradle is then raised out of the acid and passed round to a tank containing water. Pickling and swilling is carried on at the same time, and spare cradles are provided for filling and emptying, so that no delay occurs. The raising of the cradles is effected by the attendant keeping the steam-valve open, so that the piston is driven down to the bottom of the cylinder, making a stroke of 36 inches instead of about 12 inches as before. A machine such as this will execute the black and white pickling for the production of four mills easily, and there are two or three others equally effective. Pickling by hand is now almost a thing of the past, and the consequent saving is very considerable. The number of hands employed is reduced by at least one-half and the wages by two-thirds; under the old process they cost about 22/ per 100 boxes, and the work is now done for from 6/ to 7/ per 100 boxes. The quantity of acid consumed in pickling an ordinary box of black plates is about 5½ pounds.

The plates, having been thoroughly swilled to remove all traces of acid, are sorted with a view to prevent any sheets going forward that are not properly pickled. They are then packed in wrought-iron boxes termed pots, care being taken to prevent any subsequent access of air, and are placed in a furnace for the purpose of annealing, where they remain under the action of a slow fire from 8 to 10 hours. The ordinary life of a wrought-iron pot is, when carefully worked, and with re-topping, about 18 months. Cast-steel pots are being introduced, but whether they will supersede those made from wrought iron is an open question; our experience with them so far is that scaling takes place to a very considerable extent on the top and about 6 inches down the sides, and it remains to be seen whether they will have as long a life as wrought iron, although it is claimed for them that they will last nearly twice as long. This is a point of much importance to manufacturers, as the cost of annealing pots at the present time may be taken on an average at 1d. per box of plates annealed. Having been removed from the furnace and allowed to cool, the plates are passed on to the cold rolls. The object of this process is to produce a finely-polished surface, and when this is efficiently done a considerable saving in tin is effected, and the plate looks all the better in the finished state. These rolls are also chilled, but to a greater depth than those in the mills, say from 1 inch to 1¼ inches. The pressure in the cold rolls having hardened the plates, they are again packed in pots and undergo a second annealing. Cast-iron pots are used, the heat not being so great as on the first occasion. The sheets are allowed to cool, and in this state are called "finished black plate," and may be sold as such, or are passed on to the tin-house to be coated with metal.

The coating process is a most important one, and is the next step necessary for the converting of the finished black plates into tin plates. The earlier methods of performing this work were both tedious and costly: more time was occupied and a greater number of hands was employed in coating a box of plates than at present, besides which there was a great waste of metal. As the process is now carried on, a set of five cast-iron pots is provided, erected over flues, side by side. No. 1, on the right, is called the grease-pan, and contains melted palm oil or tallow; No. 2 contains molten metal, and is known as the tinman's pot; Nos. 3 and 4 contain molten metal, and are known as the washman's soaking and dipping pots, and No 5 contains melted grease. It is here that very important improvements were made about 15 or 20 years ago. Formerly the plates were placed in a rack for the superfluous metal to drain off, but about the time named two improvements were patented, namely, an arrangement of rolls in the grease-pot, an invention known as the Cookley patent, and the other a system known as Morewood's patent, and the trade is much indebted to these patentees for the benefit derived from their respective inventions. The rolls are made from steel, and can be so adjusted as to regulate the quantity of metal on each plate. By this process the plates are flatter when finished, the metal is deposited more evenly, and waste is prevented. When the black plates have to be coated it is necessary to pickle them a second time, which is called white pickling. To prepare the surface for the adhesion of the metal, and to remove the

water left on the plates from the swilling, they are immersed in the palm oil in pot No. 1 for some three or four minutes—about 28 sheets at a time. They are then transferred from the palm oil to the tin pot No. 2, where they remain about another four minutes; they are afterward handed to the washman, who brushes them to remove scruff from the surface. This done, they are immediately dipped in a second bath of metal at a lower temperature, and passed through the rolls in pot No. 5. A boy receives them from the rolls, and they are then ready for cleaning, which is effected by pushing them to and fro in bran, and by rubbing them with sheepskin. It is possible to tin about four boxes of ordinary-sized plates in the hour. After they have been sorted they are packed in elm boxes ready for sale. Some manufacturers make the packages of iron, but this method is not yet very generally adopted. Terne plates are made in a similar manner, the metal used for coating being a mixture of tin and lead.

Tin plates have been coated by the aid of electricity, but we do not hear of the process being extensively adopted. Possibly this method is only in its infancy, and ere long more may be heard of it. Within the last few years almost a revolution has taken place in the manufacture of charcoal plates by the substitution of soft steel or ingot-iron bars for charcoal iron. Plates of a very high quality are required for stamping and other purposes, and it will now be admitted that plates manufactured from steel will work equally well with those made from charcoal iron, the cost of production being in favor of the former. There is, however, one notable exception in favor of charcoal iron, and that is in black plate made for japanning; it is found impossible to get the japan to adhere to the black plate made from soft steel. Manufacturers are watching with interest the development of the production of steel, in view of its adaptation to the manufacture of bars for coke plates. The charcoal-plate trade has entered upon a new phase in consequence of the introduction of steel made by the Siemens-Martin process, and it is not improbable that ere long the the coke tin-plate trade is destined to be similarly affected, and doubtless its future will run in close connection with the progress of steel-making. Messrs. Thomas & Gilchrist, in a paper given before the Society for the Encouragement of Arts, Manufactures and Commerce, on April 27 last, claim to be able to produce ingot iron by their process at a less cost than puddled bar, and the question arises whether the material produced would be sufficiently uniform in quality and otherwise suitable for the manufacture of tin plates. Offers are received from the Continent by tin-plate makers of "soft-steel" blooms and billets made by the basic Bessemer process, but we do not yet know of any manufacturer in this country who has tried them. We presume that they would be produced at a less cost than Siemens-Martin soft steel, but it remains to be seen whether they will make plates that will stand the same tests.

Comparative Blast-Furnace Practice.

(Concluded from page 13.)

The superior results afforded by charcoal, in the cases we are considering, are due to the higher state of oxidation of the gases. In the calculation of heat evolved, as already given, the carbonic oxide generated by the action of carbon on carbonic acid is excluded; but in estimating the composition of the gases, it is necessarily brought into the account. Now, analysis showed the composition of the gases to be as follows:

Furnaces.	Weight.	Carbonic acid.	Carbonic oxide.	Carbureted hydrogen.	Hydrogen.	Nitrogen.
Furnace 2...	100 =	22.37	23.84	.37	.09	53.33
Furnace 3...	100 =	24.93	23.13	.32	.09	51.53
Cleveland...	100 =	17.30	25.20	...	.10	57.40

In these the ratio of carbon as carbonic acid to carbon as carbonic oxide and carbureted hydrogen by weight is:

	As carbonic acid.	As carbonic oxide and carbureted hydrogen.
Furnace 2.....	1	1.72
Furnace 3.....	1	1.49
Cleveland.....	1	2.38

It has to be remembered that the iron made in the Vordernberg furnace is white iron, whereas we are comparing it with gray foundry pig in the Cleveland furnace. Now, the difference between my figures representing the absorption of heat for foundry iron and those which appear as really obtained for white iron, viz: 5004 calories, equal to 9.6 per cent., is by no means greater than might, under the circumstances, be expected for the two kinds of metal.

We still have to reconcile the different ratios of carbonic acid and carbonic oxide found to obtain in these Vordernberg furnaces and in those of Cleveland. My observations on the conduct of furnaces smelting the ore of the last-named locality have led me to conclude that when the ratio is 1 volume of CO_2 to 2 of CO, the mixture of gases ceases practically to act on Cleveland ironstone. The largest average proportion of CO_2 I have found was represented by the proportion of 1 vol. of CO_2 to 2.09 vols. of CO. As a rule, fairly good working is obtained when the ratio is 1 vol. of CO_2 to 2.20 of CO. In three examples of charcoal furnaces we have 1 vol. of CO_2 accompanied by 1.49, 1.72 and 1.87 vols. of CO.

It has to be borne in mind that, in stating that certain mixtures of these two gases at a given point become exhausted in their reducing power, it is not to be understood that carbonic oxide cannot, under any condition whatever, rob an ore of any more of its oxygen when once the resulting gas, which has effected the deoxidation, is charged with carbonic acid to the extent just named.

Suppose a small quantity of the oxide of carbon to be passed through a large excess of ore, then there is no difficulty in converting the whole of the gas made use of into carbonic acid. This, however, does not mean the reduction of the oxide of iron to the metallic state; it is merely the separation of the first, and what may be considered the most loosely united, portions of the combined oxygen from the ore.

As illustrating the subject under consideration, I found in the laboratory that a mixture of 100 vols. of CO and 50 of CO_2 at a temperature of 417° C. (782° F.) only separated 2.10 per cent. of the combined oxygen in calcined Cleveland stone in 5½ hours, and 10.04 per cent. in 11½ hours.*

At the furnace itself the results obtained indicated a very languid action when the ratio of the two oxides of carbon approached that just named. Thus 100 vols. of CO mixed with an average of 40 to 45 of CO_2, at an average temperature of 312° C. (594° F.), in 24 hours only separated 3.72 per cent. of the oxygen combined with the iron in calcined Cleveland ore.

As an instance of the want of power of certain mixtures of the two gases in question to produce metallic iron, a mixture consisting of equal volumes of CO_2 and CO was passed over iron ores of different kinds, and over pure spongy iron at a bright red heat. As soon as the oxide of iron lost one-third of its oxygen, becoming protoxide, all further action ceased. At the same time the pure iron was oxidized, having also passed into the state of protoxide.

Now, when we compare the ratio in which the carbonic acid, the oxidizing gas, and the carbonic oxide, or the reducing element, is found at different levels in a furnace working at Eisenerz and in Cleveland, the difference, according to the analysis of Professor Richter and M. Tunner, is remarkable:

	Wibna, of 2400 cub. ft.	Cleveland, of 6080 cub. ft.
Escaping gases contain per 100 vols. CO.....	Vols. 57 CO_2	28
About 18 feet from top..	48.8	3
About 28 feet from top..	44.8	5
At the tuyeres.	7.7	trace.

In the Cleveland furnaces, particularly those having a hight of 75 or 80 feet, the gases are remarkable for the small quantity of carbonic acid they contain when taken below a certain level. The following examples, obtained from a furnace of 17,500 cubic feet capacity, are illustrative of this assertion:

Point of sampling.	Vols. for CO_2 per 100 of gases.	Vols. of CO per 100 of gases.
At tuyeres.....	.0	35.4
At tuyeres.....	.0	34.4
At tuyeres.....	1.3	36.3
At tuyeres.....	.0	34.8

Point of sampling.	First experiment per 100 of gases.		Second experiment per 100 of gases.	
	Vols. of CO_2.	Vols. of CO	Vols. of CO_2.	Vols. of CO.
16⅓ feet from top.....	2.22	34.08	2.25	33.31
20 feet from top.....	.67	35.11	.73	34.84
39 feet from top.....	1.09	34.96	1.00	35.08
52¾ feet from top.....	1.51	35.24	....	.....
65 feet from top.....	.50	35.92	.49	36.03
70⅓ feet from top.....	.00	36.61	.00	37.60
At tuyeres.....	.81	37.70	.73	37.86

Against these figures I will place the composition of the gases in an Eisenerz charcoal furnace, which has a hight of 52.65 English feet and a capacity of 3592 cubic feet:

Escaping gases.	Vols. of CO_2 per 100 of gases.	Vols. of CO per 100 of gases.
Average of two trials.....	16.02	17.87
18 feet from throat.....	14.86	19.39
25½ feet from throat.....	13.93	18.77
28 feet from throat.....	13.87	19.69
34 feet from throat.....	12.35	20.46
34½ feet from throat.....	2.98	38.56

No doubt the interior of a furnace presents very different conditions from those in the laboratory experiment already alluded to, or even in the furnace gases themselves. In both the latter cases solid carbon is absent, whereas in the furnace it exists in great abundance. In the furnace itself, however, the same law holds good as where carbon is absent, although it is modified. Thus certain mixtures of gases are unable to withdraw above a certain quantity of oxygen for an ore. In like manner, certain mixtures of carbon and gaseous oxides of carbon, the latter in certain relations to each other as to quantity, may separate a certain proportion, and no more, of the combined oxygen. In both cases particular mixtures might be unable to produce any metallic iron at all; in others, a smaller or larger quantity of the metal might be reduced, leaving a larger or smaller proportion of unreduced oxide to be carried off in the slag. This is what, in point of fact, happens in the two cases we are discussing. The slag from a Cleveland furnace contains often as little as .25 per cent. of protoxide of iron, whereas in that run from the Vordernberg furnaces 3.25 per cent. is found.

In the experiment with equal volumes of CO_2 and CO, a position of static equilibrium is reached when the iron is reduced to the condition of protoxide. In the Vordernberg furnace a similar state of things obtains only when all the iron is reduced to a metallic condition, except that portion which, as just described, is found in the slag as protoxide.

All the figures to which I have had access seem to prove that charcoal possesses no superiority whatever, from a heat-producing point of view, over coke, and that its apparent economy in the production of a ton of pig, in manufacturing either white or gray iron, is due exclusively to the quantity of heat required being less than that in those coke fuanaces with which it has been compared.

Although a given number of units of the two kinds of fuel may afford the same quantity of heat, there are, nevertheless, unquestionably some differences in the mode in which the needful heat is developed by the two kinds of fuel which merit notice.

My own experiments, and those of Professor Akerman, prove that coke and charcoal, as they are charged into the blast furnace, are readily affected by heated carbonic acid. Both sets of experiments also point clearly to the fact that charcoal is much more readily acted on by this acid than coke—a circumstance which would prepare us for expecting that, instead of a greater ratio of carbonic acid to carbonic oxide being present in the gases of a charcoal furnace, there should be less. Many years ago, however, I proved that previous ignition rendered both coke and charcoal less susceptible of being attacked by hot carbonic acid, and here again my observations have recently been confirmed by those of M. Akerman.

On passing a stream of carbonic acid over charcoal and coke separately at a good red heat, the issuing gases, according to this

* In a furnace of 12,000 cubic feet, 85 feet high, the proportions of carbonic oxide and carbonic acid are at the top as 100 vols. to 45, but as we descend the CO_2 rapidly disappears.

authority, contained, with charcoal, 13 per cent. by volume of carbonic oxide; with Durham coke 2.5 per cent. When, however, both had been previously ignited, there was practically very little difference between the two; the issuing gases contained from 1 to 1½ per cent. of carbonic oxide, indicating that very little action had taken place between the fuel and carbonic acid.

Now, it is not impossible that charcoal which has its resisting powers brought up to an equality with coke in the manner just described may even greatly surpass coke in resistance to carbonic acid when both are exposed to the more intense heat of a blast furnace, and when the previous ignition, therefore, takes place at a much higher temperature.

So much, at any rate, is certain—that in the coke furnaces which I have examined a mere trace of carbonic acid is found in the gases at a third of the hight from the throat. Further, it must be observed that, having regard to all the circumstances, such as the power with which Cleveland stone retains its oxygen, the amount of resistance offered by Durham coke to the action of carbonic acid, and the temperature of the upper part of the furnace, a position of equilibrium is arrived at when, in a furnace of 48 feet, about 33 per cent. of all the carbonic acid, whether introduced as such into the furnace or generated by chemical action, has disappeared, or about 20 per cent. in one of 80 feet. The position of equilibrium referred to consists in there being in the case of the 48-foot furnace about 25 volumes of carbonic acid for every 100 of carbonic oxide, and about 45 in that of an 80-foot furnace.

Very different are the conditions which obtain in a charcoal furnace. This is apparent in the comparison already given between the Wrbna Furnace and a coke furnace of 6000 cubic feet smelting Cleveland ore. From the information communicated to me, I have calculated, as nearly as I can, the weights of carbonic acid per 20 units of iron existing in the gases at various depths of the Wrbna Furnace, which is about 37½ feet in hight. These are as follows:

	Escaping gases.	18 feet from throat.	25½ feet.	28 feet.	33 feet.	34½ feet.
	a.	*b.*	*c.*	*d.*	*e.*	*f.*
Units of carbonic acid in gases	15.42	14.76	14.79	13.39	13.29	3.20
Units of carbonic oxide in gases	17.18	19.25	18.14	19.01	20.02	26.33
Units of total oxygen in gases	21.03	21.75	21.12	20.60	21.11	17.38

Having regard to the oxygen contained in the material, as given in the analysis in M. Friderici's paper, and its capability to generate carbonic acid, it would appear that there is a disappearance of fully as much of this acid from the gases as in the case of a 48-foot furnace working on Cleveland stone with Durham coke, viz., about 33 per cent. Instead, however, of the carbonic acid being confined to 25 vols. (or even 45 vols., as in the 80-foot furnace), to 100 of carbonic oxide, it is found in the ratio of 57 to 100.

There is another striking difference between the behavior of a furnace working with charcoal and one working with coke. While with coke nothing but a mere trace of carbonic acid is found in the gases at a distance of one-third the hight of the furnace from the top, with charcoal there is nearly as much of this gas found at a depth of two-thirds—*i. e.*, 25½ feet from the throat—as appears in the escaping gases.

By far the largest quantity of the carbonic acid found in the gases of any blast furnace is due to the reduction of the ore. Now, I have proved by experiment that there are very great differences in the time required for separating oxygen from iron in different kinds of ore, but of all ores the spathose variety, used in the Styrian furnaces, is the most easily reducible. This fact would imply that deoxidation in these charcoal works should be more speedily accomplished than it is in a coke furnace in Cleveland, the ore of which latter district I have found to be the most refractory of all ores I have examined.

This rapidity of reduction actually takes place in the Styrian furnaces, for, although by far the greater portion of the oxygen is not separated until the ore reaches a point at a distance from the throat and close to the tuyeres, it must be remembered that, owing to the diminutive size of the furnace, this zone is reached in a very short time. Between *e*, *d*, *f*, in the table given—a hight of only 6½ feet—almost the entire process of reduction is effected, for above *e*, up to the point of final escape, there is practically no increase in the amount of oxygen contained in the gases.

This view of the process of reduction is confined, to some extent, by a very instructive experiment of Ritter von Tunner's, more than 22 years ago. He found that the first signs of reduction did not appear until the ore had reached a depth of 17 feet in the furnace, but at a similar level, in a coke furnace of 48 feet, this operation is entirely completed. This depth, however, in the charcoal furnace is reached in one hour, whereas in the coke furnace the ore does not arrive at the same point until after the lapse of about 12 hours. Thus the zone of reduction, in the case of charcoal, is greatly lowered in point of position, and the gases above it are so largely charged with carbonic acid as to be unable to deoxidize any of the freshly-introduced ore through which they are passing.

In three or four hours the mineral reaches *e* and *d*, while the temperature is so high that reduction is extremely rapid, and where it would, in a coke furnace, be accompanied by the conversion of the carbonic acid into carbonic oxide, causing thereby a great loss of heat. It is, however, inferred that the position of static equilibrium, as affected by temperature and the proneness of carbonic acid to be resolved into carbonic oxide, is maintained by the previous ignition of the charcoal, which is thus rendered inert, comparatively speaking, in its action on the oxygen of the carbonic acid.

Notwithstanding the energy with which cyanogen compounds are able to rob iron ores of their oxygen, I am not prepared to suggest that they necessarily play an important part in the reducing zone of the blast furnace. In charcoal furnaces the excess of alkali may probably be productive of a larger quantity of cyanides than in furnaces using coke; but even then it may be doubted whether the process, taken as a whole, is materially affected by their presence.

By raising the blast, by means of brick stoves, to temperatures from 700° to above 800° C., the following coefficients per unit of coke have been obtained:

Hight of furnace, feet	76	90
Capacity of furnace	20,642	35,016
Weekly make, tons per 1,000 cubic feet	24	13
Coke, per ton	22.3	19.69
Temperature of blast C	780°	819°
Temp're of escaping gases C	412°	222°
	Calories.	Calories.
Combustion of carbon	3442	3551
Contained in blast	747	793
Total	4189	4344
Less carried off in gases	464	189
Useful coefficient	3725	4155

An important item in the evolution of heat by the fuel is the extent to which the carbon is burnt to the state of carbonic acid. There is no doubt that in this respect the charcoal furnaces greatly surpass any coke furnaces I have had an opportunity of examining. I annex a synopsis of the relations of carbon in the two conditions of oxidation, carbonic acid being taken as unity:

	Charcoal Furnace 2.	Charcoal Furnace 3.	Cleveland.	Cleveland.	Cleveland.	Cleveland.	Cleveland.
Blast° C.	300°	485°	485°	522°	718°	780°	819°
CO	1	1	1	1	1	1	1
CO	1.72	1.49	1.28	2.09	2.53	2.89	2.26

It needs no figures to prove that, provided the gas is equally saturated with oxygen, an elevation of temperature in the blast must be attended with an economy in the fuel consumed. But my own inquiries have led me to infer that, in furnaces of moderate size, receiving their blast at the high temperatures supplied by fire-brick stoves, the gases have not proved generally as rich in carbonic acid as those fed with air at more moderate temperatures, whether from some difficulty connected with the conduct of furnaces under 25,000 cubic feet of capacity, or from some other cause, I am unable to say. As a consequence of this state of things, and in spite of so much more heat being imparted through the blast, according to my experience there has not been any very great economy in the use of superheated air—always, be it remembered, comparing furnaces in good working order.

These observations apply to the smelting of Cleveland ironstone; but I have recently examined the results obtained in smelting hematite ores at four different works for the production of Bessemer iron, with the following results:

	A.	B.	C.	D.
Hight furnaces, ft.	60	60	70	70
Stoves, metal or fire-brick	Fire-brick	Fire-brick	Metal	½ M. ½ F. B.
Coke, per ton	20.56	20.60	20.33	20.35

In some cases, no doubt, the results may be affected by differences in the quality of the minerals; but in the case D, I have separated the consumption of coke with the two descriptions of stoves, the same kind of minerals being used at all the furnaces. The results were:

From metal stoves	20.34
" "	20.55
Average, cwts. per ton	20.54
From fire-brick stoves	19.97
" "	20.37
Average, cwts. per ton	20.17

It may be that superheated air requires a much larger furnace in order to realize the full benefit it is capable of affording. According to the figures of Mr. Charles Cochrane, Cleveland iron is being smelted with something under 19 cwt. of coke, which is about 1½ cwt. less than I have met with under the most favorable circumstances. In this instance, however, per 1000 cubic feet capacity, the produce was only half that of furnaces driven with air at about 560° C. (1040° F.)

There is but one other point to which I would ask your attention, viz.: the great make of many furnaces using charcoal as their fuel. The usual produce of a coke furnace smelting Cleveland stone is about 30 tons of gray iron per 1000 cubic feet of capacity per week. The Luxembourg furnaces, using ore of the same geological position as those of Cleveland, run as much as 50 tons of white iron per 1000 cubic feet of capacity, and from 50 to 55 tons is about the rate of working on English or Spanish hematite. It will be observed, however, that in the two Vordernberg charcoal furnaces we have a make of 73 and 93½ tons of white iron per week per 1000 cubic feet of capacity, and I have seen in America charcoal furnaces running 100 tons of gray metal per 1000 cubic feet.

It is clear that the facility with which an ore is acted on by the reducing gas if the furnace must necessarily affect the rapidity with which the furnace can be driven. By actual experiment I ascertained that at a temperature of 410° C. (770° F.) calcined Cleveland stone, when exposed to carbonic oxide, lost, in a given time, about 20 per cent. of its combined oxygen, while Lancashire ore parted with 2½ times this quantity. Under such circumstances it is not surprising that charcoal furnaces using rich hematites should make much more iron than coke furnaces using clay ironstone. As a rule, however, up to a recent date the make per 1000 cubic feet was notably larger in charcoal furnaces than in those using coke, even when smelting the same class of ore. But I have recently learned that the furnaces at the Edgar Thomson works, near Pittsburgh, 80 feet high, with a capacity of 15,000 to 16,000 cubic feet, are producing weekly fully 100 tons of coke pig per 1000 cubic feet, working on rich Bessemer ore.

There is no question whatever that driving furnaces at any such rate leads to their rapid destruction, so that three years is a pretty long life for one which is turning out so large a quantity; whereas a furnace

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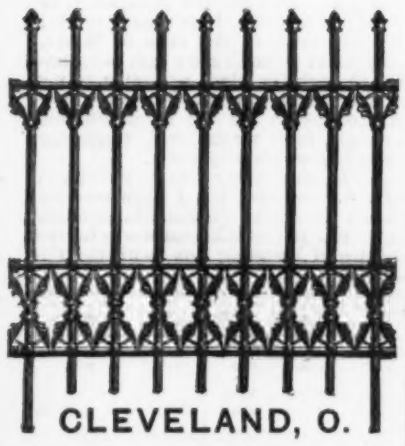

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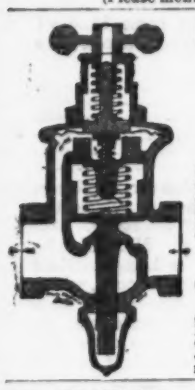

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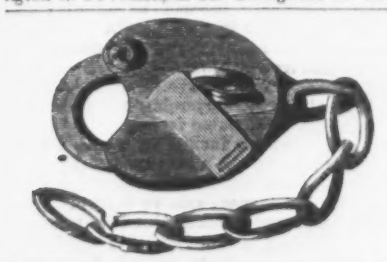

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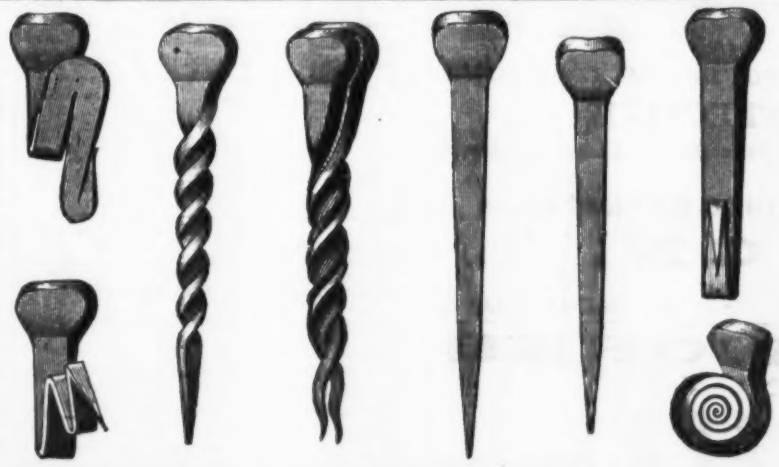

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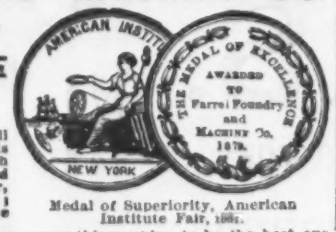

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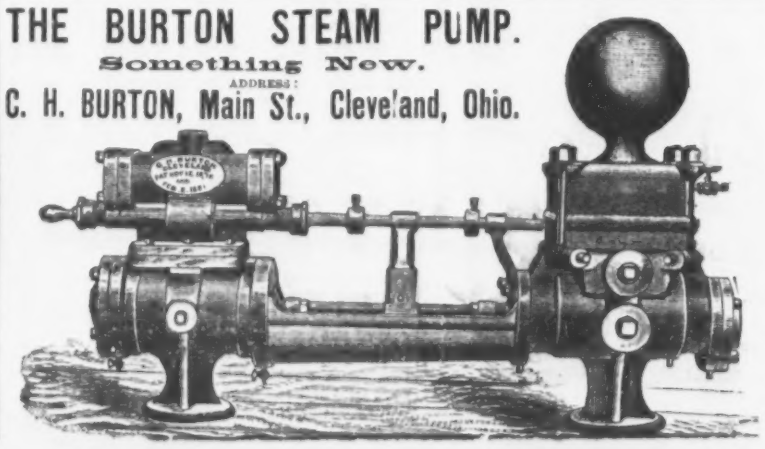

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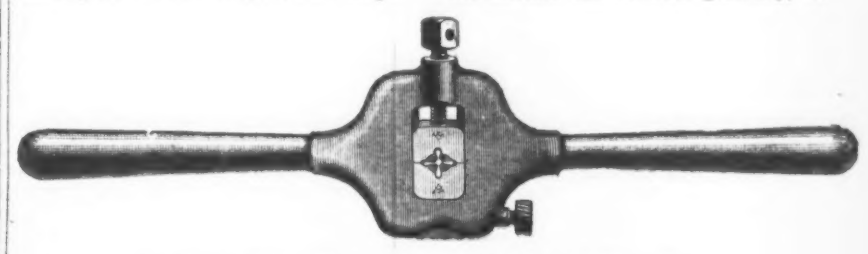
New Screw Plate.

Mr. J. M. Carpenter, of Pawtucket, R. I., is introducing a new screw plate, a general view of which is afforded by the larger of the accompanying engravings, while details of the dies and the yoke to hold them in place are shown in the second. The improvement consists of the means of holding the dies in place and removing them for the purpose of an exchange. As will be seen by the smaller engraving, the dies are grooved along the side and are held in place by a yoke piece slipping through in grooves and into slots milled along the opening in the plate. When the yoke piece is in place it is locked fast by the smaller screw shown at the bottom of the general view. The dies are closed against the bolt which is being cut by means of the screw shown at the top of the general view. This tool differs in its general features from the ordinary stock and dies in the market, as will be readily perceived, and



New Screw Plate.—Fig. 1.—Carpenter's Improved Screw Plate.

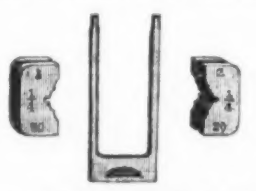


Fig. 2.—Detail of Die and Yoke Piece.

its features are so unlike the ordinary tool that the manufacturer calls it an improved screw plate instead of designating it by the other name. The method pursued gives free access for cleaning all parts at the same time, holding them firmly in place when in use.

LATEST LEGAL DECISIONS.

PRELIMINARY RIGHT TO ARBITRATE BEFORE SALE.

Under an agreement for the use of certain patents, the purchaser had the right to have the price fixed by three arbitrators if a difference arose. The inventor refused to accede to an arbitration, and insisted on his right of revocation and a reassignment of the letters patent. He applied for a preliminary injunction to restrain the purchaser from using the inventions in the suit—Perkins *vs.* United States Electric Light Co. —in the United States Circuit Court for the Southern District of New York, and his motion was denied. Judge Wallace, in the opinion, said: "It is a familiar doctrine that a simple agreement inserted in a contract that the parties will refer any dispute arising thereunder to arbitration will not oust courts of law of their ordinary jurisdiction. Either party may sue the other upon the contract without having offered to arbitrate. He may be liable for damages for a breach of his agreement to arbitrate, but the agreement will not bar his suit. If, however, the contract stipulates that the arbitration is to be a condition precedent to the right to sue upon the contract, or if this may be inferred upon construction, no suit can be maintained unless the plaintiff has made all reasonable effort to comply with the condition. The question here is as to the price of certain patented machines, which are of a conjectural value, and it is peculiarly appropriate that the parties should be held to their contract according to its terms and intent."

PROMISSORY NOTE—RATE OF INTEREST NOT CERTAIN.

A note was made which was to bear "interest the same as savings banks pay." The validity of the note as a negotiable instrument was assailed in an action on it—Whitwell *vs.* Winslow—and the Supreme Judicial Court of Massachusetts decided against its negotiability. Judge Field, in the opinion, said: "The promise to pay interest has not that degree of certainty in regard to the amount of money to be paid which is requisite to constitute a negotiable promissory note."

CONTRACT—BUSINESS USAGE.

An action was brought to recover the value of cotton burnt while in the defendant's cotton gin or press, but the defendant set up that he was not an insurer, and succeeded. In this case—Norris *vs.* Fowler—the plaintiff appealed to the Supreme Court of North Carolina, on the ground that he was not permitted to show on the trial that it was the defendant's custom to pay as an insurer. The Court, through Judge Ruffin, decided in favor of the plaintiff. In the opinion it was said: "For the purpose of fixing upon the defendant a liability as an insurer, the plaintiff tendered several witnesses to prove that the defendant, while ginning cotton for them, had declared that he held himself responsible for all cotton taken to his gin until it left the press, the plaintiff also proposing to show that these declarations were made known to him before he took his cotton to the gin. The usage of an individual in his own business as to the manner of performing it, and the like, if known to the party dealing with him, is competent to show that the contract was on those terms."

I.—VALIDITY OF NOTE MADE IN FOREIGN STATE. II.—USURY—RATIFICATION.

A promissory note was made in Nebraska, but it was payable in New York. In a suit upon it—Joslin *vs.* Miller—the defense of usury was set up, upon the ground that it was a New York note, and the interest greater than was allowed there, and also that the rate was more than was permitted in Nebraska. The plaintiff was defeated and he appealed to the Supreme Court of Nebraska. Judge Maxwell, in the opinion, said: "1. This note having been made in Nebraska, though payable in New York, is a contract of Nebraska. 2. The rate of interest was greater than the statutory rate in this State, and the plaintiff cannot recover any interest by reason of the statute. He insists that he is not to be bound by the acts of his agent who took this usury; but the contract made by the agent must be adopted as a whole, and as the principal—the plaintiff —has affirmed the contract generally, he must be held to have adopted all the instrumentality employed by his agent to bring it to a consummation."

The Mound Builders.

At the annual meeting of the Boston Society of Natural History, a highly interesting statement was made by Prof. F. W. Putnam, Curator of the Peabody Museum of Harvard University, concerning his recent explorations of certain mounds in the Ohio Valley. The subject was illustrated by drawings hung upon the wall, and by photographs. These explorations, in which he was assisted by Dr. C. L. Metz, of Madisonville, Ohio, were made last year, and were restricted to one particular mound-field or tract upon the borders of the Little Miami River, in Madisonville, about 20 miles from Cincinnati. It is to be regarded as one of the felicities of the event—for the work and its results constitute an event in the full significance of the word—that, being situated so near to one of the great cities of the land, it has happened that no persons impelled by mere idle curiosity have hitherto dug into these mounds in a random way, and thus practically destroyed them in respect to their special value to the archæologist. The excavations now made were conducted upon the most approved methods of science. Nothing worthy of notice has escaped observation and record, and every relic has been carefully preserved for scientific purposes. In the brief discussion which followed the Professor's statement, one of the members of the society declared the results thus reached to be the most important discovery yet made in American archæology. Several of these mounds were what are called "altar mounds," and in these the valuable and instructive relics were found. These, in number and variety, were sufficient in themselves, if none others had ever been found, to give a very distinct—it might almost be said comprehensive—idea of the civilization or the social state of the ancient mound builders. Among other things found were articles of personal adornment, such as ear-rings of pearl and bracelets of metal. The precise advance of the art of working metals is thus disclosed. The metals had been wrought by hammering the ore. Molten work was beyond the skill, or rather the knowledge, of the artificer. The metals were iron, copper, silver and gold. This is the first time gold has been found in the mounds. The gold, and in some instances the silver, was used for plating an inferior metal, being hammered thin and clinched at the edges. Most significant of all, perhaps, was a little statuette, which not only presented the human form in a shapely—it might almost be said artistic—contour, but showed also the ear-rings and the drapery of the waist which were fashionable in the American prehistoric times. Some of these relics must originally have come from the Florida coast, from Lake Superior and from the Rocky Mountains, indicating thus either extensive migration or intercommunication. The indications are that cremation of the dead was practiced by these natives, and that an altar mound is significant of some great sacrificial ceremony, and that these trinkets and relics, some of which pertained to the useful arts, represented an offering on the part of these people, equivalent, in comparison with our scale of values, to hundreds of thousands of dollars.

The Worcester Free Institute.—We have before us circulars containing a statement of the work of the well-known Worcester Free Institute. It has now completed its fifteenth year of actual work. During the last term of which record is given in the catalogue 105 students were under instruction, of whom about one-half were from Worcester County and three-fourths from the State of Massachusetts. During the last year 31 students were graduated, and some 90 students, in all, received free tuition. Worcester County has, in effect, received from the institution tuition amounting to more than $100,000, and the State has availed itself of the free tuition offered to rather more than the same amount. Of the work of this widely-known school it would seem hardly necessary to speak, since, like some other of our industrial institutions, it is known almost everywhere. One very interesting table is given in one of the circulars, which shows that more than 95 per cent. of the graduates of the school are engaged in occupations for which their training in the institution especially prepared them. There are few schools or colleges in the country which make as good a showing as this.

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AND

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New York, Thursday, June 7, 1883.

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CONTENTS.

The Labor Situation West.

Since our last statement regarding the labor situation in the iron mills of the West affairs have moved very rapidly to a conclusion, and that conclusion was a great surprise, not only to most of those concerned, but to the whole country. The indications up to last Thursday pointed unmistakably to the commencement of a strike in the majority of the iron mills west of the Allegheny Mountains, but on Thursday a conference with the Amalgamated Association was sought by the manufacturers, which conference, after remaining in session about two hours and a half, signed the scale of last year with some modifications, and with certain exceptions to be noted hereafter. Work only ceased in those establishments which had not received notice of the signing of the scale. The manufacturers to all outward signs had been very firm in their determination not to sign the scale of last year, but to insist on their demand for a reduction. A largely attended meeting of the Manufacturers' Association was held in Pittsburgh on Tuesday, the 29th ult., at which the future conduct of the strike was committed to the charge of the conference committee, with the understanding that the scale was not to be signed nor work resumed, except at the reduction, until this committee so directed. At this meeting it is understood that a number of the Western mills were conspicuous by their absence. After that meeting events seem to have culminated rapidly, and, as is already stated, the Pittsburgh members of the conference committee sought a meeting on Thursday with the conference committee of the Amalgamated Association, and in this meeting the scale was signed for another year.

The reason of this action on the part of the conference committee, as given out by them to the Pittsburgh papers, was that they had become convinced from information received that a majority of the mills west of Pittsburgh, Wheeling and the valleys, and some mills in these three districts, had decided either to sign the scale and continue work at the old price and allow the other mills to make the fight while they were reaping the benefit, or that these mills were prepared to run on conditions, the conditions generally being that they were to pay the old prices until the strike was settled in Pittsburgh, and then whatever wages were agreed upon in Pittsburgh should be the wages that they should pay from the time of the agreement. Of this fact these seems to be no doubt, and it was a determination on the part of the Pittsburgh members of the conference committee that they would not permit themselves to be made a catspaw to rake the chestnuts out of the fire for other mills that led them to the course decided upon.

At Cincinnati the situation was somewhat different. The puddlers had made a demand for 50 cents a ton extra, or the payment of the prices ruling prior to the long strike in 1881. The finishers had not joined in this demand, and the evidence seems to be that they would not have aided in securing it, but would have continued working at the 1882 prices on what muck bar was on hand or could be procured. These mills had refused to join with Pittsburgh and the other mills in demanding a reduction, on the ground that they had a contract with their men that in case of trouble at Pittsburgh they were to continue at work pending the settlement of the question there, or, in other words, they had a contract that would center all future fights in Pittsburgh, and, indeed, this seems to have been the design with a large number of Western mills—with here and there an exception. The Pittsburgh manufacturers very wisely and very properly refused to fight battles for the whole West, believing that they were in a position to pay as high prices for labor as any one, and if the mills in other sections of the country desired a reduction in wages they must assist in getting it.

The dispatches received from different points in the West outside of Pittsburgh indicate that the manufacturers profess to be very indignant at the action of Pittsburgh, and it is claimed in Pittsburgh that some of these dispatches purport to represent the views and intentions of some of the very parties who were, in an underhanded manner, trying to lead Pittsburgh into a strike while they were proposing to run. Whatever view may be taken of the action of the Pittsburgh manufacturers, it is evident that it will be regarded by the workingmen—and to some extent justly so—as a victory for them, though it is evident that their victory comes not from their strength, but from the weakness of the manufacturers. Had there been the unity and honor among the manufacturers that was developed last year, the condition of things would have been different, and the Amalgamated Association, instead of being rehabilitated by the action of the manufacturers, would be in the Slough of Despond trying to find some way to firm ground. No doubt the Amalgamated Association will make the most of their victory. It remains to be seen, however, whether this will prove such a victory for the Amalgamated Association after all. The unwise use that the radicals in the association are likely to make of it may ultimately injure the association more than a manufacturers' victory now. It is evident that there may be victories that are, in reality, defeats, and the refusal of the Amalgamated Association at this time to consent to a reduction which seemed necessary, while at the same time they are conceding reductions in steel, which is pressing iron so hard, may make this victory in the end a defeat. There is no doubt that the proportion of steel that will be used by the iron rolling mills of the country will very largely increase during the present year, by reason of the refusal of the puddlers to accept the reduction asked. Steel for certain purposes is better than iron, and in many cases cheaper, and offers are being made, and in some cases accepted, for large quantities of steel for use in the iron rolling mills of Pittsburgh and the West; and this steel can be supplied from England and rolled into shapes and forms and sold at the same price as iron, with a greater profit than the iron men can realize in making the same shapes and forms out of iron puddled in their own mills. In many cases, also, the iron manufacturers will find it more to their advantage to purchase the steel in its finished form and supply it to their customers than to roll iron into the same forms and supply it. The result will be that while the use of steel will most seriously affect the puddlers by taking from them a large amount of work, it will seriously affect the finishers by taking from them part of their work, though not so large a proportion as will be taken from the puddlers. There is no doubt, also, that the condition of trade in the West in the iron mills has not been misrepresented, as will be evident before many months have passed. It is simply impossible, with steel pressing them so hard in the higher forms of iron, or those forms that bring the highest price, leaving the iron manufacturers only the less profitable forms, that these manufacturers can run and pay the present prices and make any profit. This fact must become manifest in the near future. In the depression, if not the bankruptcy, that will follow from this state of affairs, the workingmen themselves must suffer. Some of their wisest and coolest heads see this already, and believe that a mistake was made in not conceding the reduction asked.

The Metal Exchange Election.

On Monday last the New York Metal Exchange completed its organization by electing officers, and the incidents of the canvass show that our recent editorial remarks on the impossibility of reconciling the two elements represented by the Wall street and the Pearl street exchanges were entirely in accord with the facts. There has been no real union of the two exchanges, and there is less chance of such union now than ever before. The eighty gentlemen, more or less, who have gone over from the Wall street organization into the Pearl street organization have simply been absorbed. The fact that the ticket elected concedes some offices to the Wall street contingent counts for very little. The Pearl street exchange controls by virtue of larger numbers, and has committed its members to the policy of management which those who organized and joined the Wall street exchange were most anxious to discourage. Thus far the tricks have all been taken by Pearl street, and Wall street has given up the game.

There was an honest and vigorous effort made by the Committee of Twenty to induce the membership of the Wall street exchange to come into the Pearl street exchange. Had this effort succeeded, the so-called conservative element would have had an undisputed control of the organization. They were not, however, disposed to come in. A majority of them doubted the utility of an exchange or the possibility of giving it permanence. They preferred to stand aloof in a dignified attitude and await developments. If the question at issue had been an exchange or no exchange, their position would have been a judicious one; but, since an exchange was determined upon, and its quotations must have more or less influence with consumers, it would have seemed good policy on the part of the merchants and heavy men of the metal trades to have come in and effected such an organization as would best protect their own interests. Mr. John C. Cook, of the firm of Bruce & Cook, was especially interested in this matter. The ticket favored by the conservative element was as follows: President, Theo. Sturges. Vice-President, George V. Tompkins. Treasurer, T. Delafield. Secretary, Wm. Allen Smith. Managers, John C. Cook, H. P. Egleston, A. W. Humphreys, Wm. Houston, T. D. Hazard, J. Fred. Pierson, H. B. Moore, Carl Mayer, John J. Williams, Edward P. White, Wm. P. Tilton, James E. Pope, Joshua Hendricks, E. A. Caswell. Inspectors of Election, Edward J. Shriver, U. O. Crane, S. Mendel.

The ticket supported by those favoring the encouragement of speculative business on the floor was as follows: For President, T. Delafield. For Vice-President, Frank Dickerson. For Treasurer, Carl Mayer. For Secretary, Edward J. Shriver. For Managers, John C. Cook, Joshua Hendricks, Theo. Sturges, John T. De Blois, Elliot F. Driggs, Wm. P. Tilton, B. F. Judson, John J. Williams, E. P. White, A. W. Humphreys, H. B. Moore, A. G. A. Harnickell, D. Houston, E. S. Wheeler. For Arbitration Committee, D. Thomson, C. E. Maxwell, E. A. Caswell, Daniel F. Cooney, Austin G. Gorham. For Inspectors, S. Mendel, Geo. Nissen, U. O. Crane.

To add strength to the first of these tickets Mr. Cook, one of the most highly respected gentlemen in the metal trades, issued the following circular letter:

NEW YORK, June 2, 1883.

The Members of the New York Metal Exchange.

—GENTLEMEN: The Committee of Twenty appointed by the two former metal exchanges to organize this body and provide for the liquidation of the others have completed their labors with a very great degree of unanimity, and in accordance with the agreements under which they were organized, have prepared a code of by-laws and a ticket for permanent officers, which they have commended to you for acceptance. The differences of opinion among the members of the committee with reference to the arrangement and welfare of the exchange have been upon questions pertaining to the more speculative phases of trade, which some think to be necessary to the true interests of business. The ticket presented to you by the committee represents those opposed to what they deem an unhealthy speculation, desiring to limit the business of the exchange to personal negotiation, as opposed to the system of calls.

A written request of 25 members of the exchange has led me to call you together at 10 a. m. on Monday next, for the appointment of a nominating committee to propose a ticket for your vote. The inclosed slip, cut from a morning paper, defines sharply the issues that I understand are set before you. Having been active in the formation of the present exchange, and being earnestly desirous of guarding its action from even remote elements of mere speculative transactions, will, I trust, excuse me to you, in presenting personally my request that you will sustain the ticket presented by the committee, and in doing this I wish it understood that it is without any reflection upon the character of the gentlemen differing with me, or any question of their right to appeal to you for your support of their views.

Respectfully, JOHN C. COOK.

Mr. Cook also made a few remarks from the desk just before the polls were opened, the tenor of which was much the same as his circular. Mr. E. P. White, representing the original Pearl street membership, replied. On behalf of those favoring the ticket headed by Mr. Delafield, he said he was prepared to go into the election on the issue as Mr. Cook had stated it. His confidence was abundantly justified, for the Delafield ticket was fairly elected by almost 100 majority, on the square issue of organized speculation.

We are informed by the secretary that the result of this election may be interpreted to mean that hereafter business in "puts," "calls," "straddles" and "options," and transactions on "margins," will be recognized and encouraged. Well, the experiment is an interesting one, and we see no reason why it may not as well be tried now as later. Either it is practicable or it is not, and until this is determined by experiment there is little reason to expect that differences of opinion will be settled by discussion. Experience seems to have shown that there is nothing to keep an iron and metal exchange alive without speculation; whether it can live with it we shall be better able to judge a year hence than now. In the present membership there are enough merchants with large interests at stake to place a wholesome check upon rash operators, and any one venturing to offer anything under the market, or to profess a willingness to buy at prices above the market, will be very apt to get squeezed. To make speculation interesting on a dull and steady market is certainly very difficult, and those who want to make money operating in a speculative way will be very apt to want to make prices to suit their momentary interests as buyers or sellers. If they can do this they are fairly entitled to—if they cannot they will probably give up the effort. It will not take a great while to draw the line between those who want to speculate publicly and those who prefer to do it privately, or not at all. The former are obviously in the majority, but there are enough of the latter to regulate matters, so far as bids and offers are concerned.

Confused Condition of the Copper Market.

The question as to the best course to be adopted by producers to give relief to the copper market is again prominent, which is not at all surprising at the commencement of the season, when Lake Superior has in readiness 20,000,000 pounds of copper to be shipped to where it may be wanted. A Michigan statistician who ventilates the copper situation there very thoroughly, puts the question squarely, and after demonstrating the enormous increase of production, and estimating that of other portions of the country, he calculates this year's probable output of copper at 47,000 tons of 2240 pounds, and the amount carried over from 1882 at 18,000, which would constitute a total supply for the current year of 65,000 tons. He values, with due reservations, the consumption in 1883 at 32,000 tons, which would leave a surplus of 33,000 tons to be disposed of, partly by export and partly by storing it for 1884. Assuming, then, that we actually consume 32,000 tons and carry into 1884 as much as we carried into 1883—that is to say, 18,000 tons—there would still be some 15,000 tons left to be shipped to Europe. Of this amount there have been actually shipped to Europe, or engaged to be shipped, about 7500 tons, so that 7500 tons would have to be sold or consigned to follow them. In former articles we have valued the amount to be shipped in 1883 at 13,000 tons, so that the two estimates do not differ much. But, as we said, the statistician whose figures we have taken in this article has a reservation on his estimate of American consumption in 1883, remarking that to bring it up to 32,000 tons would require the most general activity among locomotive builders and electric-light companies, as well as among the minor industries into which the use of copper enters.

We hear that the manufacturers of brass, &c., complain a good deal of a dull trade, and that a good many among them have curtailed production. At this juncture negotiations are again on foot to ease the situation by an export of a goodly amount of both Lake and Arizona copper, the first 1,000,000 pounds of the latter having gone as a pioneer lot to Europe the other day. The price mentioned in connection with a sale of Lake is a fraction below the lowest point it has yet sold at this year. If the Lake companies thus come forward and meet the exigencies of the dilemma squarely by reducing the great difference in price between their brand and other sorts, it will be a sign that they have made a radical change in their policy. It is, indeed, time that they should, for minor brands, through the difference in price, have commenced to absorb the small business, and to attract the larger business, wherever the use of Lake is not imperative in point of quality. The Lake companies did other producers a favor by keeping out of the market. Now the leading Lake company may, in the interest of shareholders, try to indemnify them for a low price by producing all the more copper, so that at the end of the year a great increase of output may compensate for a price reduction sufficiently great to enable Lake copper to enter the lists of foreign competition seriously, and measure itself in the world's markets with Australian, English, Rio Tinto, Chilean, Portuguese, German, Japanese and Cape copper. In other words, instead of timidly attending to the wants of domestic consumers unable to take a too rapidly increasing home output in a year of disappointment like the present, the Lake companies will, together with Arizona and other producers, begin to realize the destiny of American copper production, which evidently extends considerably beyond the limits of our own markets. This, at least so far as we can judge, is the best and most practical solution of a question which puzzled the metal trade when, in early spring, the true condition of things revealed itself to all who impartially and calmly judged the situation. What Europe will do as regards values, and what other Transatlantic countries may do with respect to production, in the face of these American shipments, we do not attempt to guess. If the world at large produces copper in excess of requirements, the price will sink to a point low enough to stop production where it becomes unprofitable, and the fittest will remain the survivors—a race in which we feel confident the majority of American copper mines will not succumb.

Pittsburgh's Losses from Last Year's Strike.

The threatened stoppage of the Pittsburgh rolling mills having been averted by the action of the manufacturers in renewing the old scale of wages, it may not be amiss to inquire into the effect of last year's idleness upon the production of finished iron in that section. It is authoritatively stated that the immediate cause of the decision of the Pittsburgh iron manufacturers to withdraw their resolution to reduce wages, and thus to avoid stopping their mills, was the knowledge that their Western competitors intended to continue to operate their rolling mills on conditional agreements with their hands, and even in some cases on the basis of the old scale. Much of the trade of Pittsburgh would thus have been diverted to other quarters, and it is well known that it is difficult to regain trade which has been lost. The bad effect of last year's stoppage, when many competing mills were also stopped, would thus have been intensified. To arrive in some measure at the extent of the evil consequences of a long cessation of work by the Pittsburgh mills, it is only necessary to group a few figures from the statistics recently published by the American Iron and Steel Association.

For the purpose of comparison, the Pittsburgh district will be assumed to include the rolling mills in Pennsylvania situated west of the Allegheny Mountains. This district is pre-eminent in the manufacture of rolled iron, excluding iron rails, which should be omitted for a variety of reasons not necessary to enumerate. No other single district or locality in the country has so many rolling mills, employs so many hands or turns out so much finished iron as the Pittsburgh district. It produces as much rolled iron as the States of West Virginia, Kentucky, Tennessee, Ohio and Indiana combined. Owing to the fact that during last year's labor trouble the Western rolling mills, almost without exception, stood up manfully with the Pittsburgh mills, and refused to take advantage of the idleness of the largest district in the country, but also closed their mills until the wages question was settled, a great deal of Western business was placed in mills east of the Allegheny Mountains. Persons who are not familiar with the statistics of the production of iron and steel are not aware of the magnitude of the production of rolled iron in Eastern Pennsylvania, and that in years prior to 1882 it did not fall very far short of Western Pennsylvania. The following table will show how these two sections of our greatest iron-producing State compared with each other in 1880 and 1881, and how Eastern Pennsylvania loomed up in 1882 in the production of all kinds of rolled iron except rails:

	1880. Net tons.	1881. Net tons.	1882. Net tons.
Eastern Pennsylvania	392,599	468,089	537,511
Western Pennsylvania	469,521	592,984	503,611
Total	862,120	1,061,073	1,041,122

In 1880 Eastern Pennsylvania produced 45 per cent. of all the rolled iron, except rails, made in the State; in 1881 it produced 44 per cent.; but in 1882 it arose to 52 per cent. Comparing the tonnage of the two sections, it will be found that in 1880 Western Pennsylvania produced 76,922 tons more than Eastern Pennsylvania, and in 1881 i.

produced 124,895 tons more, but in 1882 it fell 33,900 tons below. There was thus a change from 1881 to 1882 of 158,795 tons against the Pittsburgh district and in favor of the trade of Eastern Pennsylvania. If the statistics of the production of rolled iron, except rails, in the whole country be taken, the effect of the strike of 1882 upon the Pittsburgh iron trade will also be very plainly shown. The total production of the United States in 1882 was 2,265,957 tons, as against 2,155,346 tons in 1881, which shows that the strike did not cause a decrease in the production of the country at large, but that, on the contrary, there was an increased yield of 110,611 tons. It did, however, cause a decrease in Pennsylvania of very nearly 20,000 tons, and in Western Pennsylvania it caused a decrease of 89,373 tons.

Here, then, is very significantly shown the result of last year's four months' stoppage. It benefited other sections of the country, and very unfavorably affected Pittsburgh and its vicinity. The decrease in 1882, as compared with 1881, amounted to 15 per cent., which is a very large slice to be taken from the trade of a year. Of course, the diversion of trade from Pittsburgh to Eastern mills was a matter of only temporary effect. That trade naturally belonged to the district west of the Allegheny Mountains, and it was ready to return to Pittsburgh as soon as the mills there resumed operations. If the Pittsburgh mills had closed for several months this year, however, and their Western competitors had continued in operation, the diversion of trade would have been a much more serious matter, as it would perhaps have been permanent in many cases.

A Second Suez Canal.

A question much agitated in England and France, respecting the construction of a second ship canal across the Isthmus of Suez, is fast approaching a climax. Englishmen profess to see in the enterprise a splendid investment, besides providing for the inevitable demands of a growing commerce, fast surpassing any existing facilities. Indeed, the Suez Canal, even now, is claimed to be wholly inadequate. Owing to the narrowness of the passage, and other difficulties of navigation, traffic is suspended at night, lest vessels run ashore and form an impassable blockade. Frenchmen, it is said, have remained comparatively indifferent to these embarrassments in the absence of a pecuniary motive for bestirring themselves. Although four-fifths of the tonnage passing through the canal is British, more than half the shares of the company are held by Frenchmen, and the latter have a controlling preponderance in the board of direction. Moreover, Frenchmen doubtless experience a pleasurable emotion in holding a thumb on the great Eastern artery of British commerce, at the same time securing a tacit acknowledgment from the world at large of the wonderful enterprise and engineering skill which make this feat possible, and place all nations under tribute.

Under the menace of a new canal at Suez, which originally found a place in the columns of a London newspaper, and may have been broached merely in a spirit of bravado, M. de Lesseps seems at last to have concluded that a new canal is not only practicable, but desirable, and should not be delayed. In this respect his convictions appear to have suddenly changed. English shipowners are urging the project with considerable zeal. They anticipate no difficulty whatever in securing the needed concession from the Egyptian Government, whatever may have been the conditions named in the agreement of former years, designed to protect the canal builders in an exclusive prerogative. The commercial disadvantages of the proposed route weigh but little in their estimation, although it will be four times longer and occupy four days in its passage instead of two. The fact is another illustration of the old maxim that "Where there is a will there is a way," and the incentive is probably found in the extraordinary success of the canal, both commercially and politically, to say nothing of the promised grand developments of the future. The original £20-pound shares are now worth £90, and the last dividend declared was at the rate of 20 per cent. From 4,500,000 tons in 1880 the traffic has grown to 7,000,000 tons in 1882, and in a very short time, perhaps not more than two or three years, it will have exceeded the carrying capacity of the canal.

England has certainly been at great cost to maintain her original pre-eminence as a naval power, but has only fairly succeeded in attaining her ambition. In an elaborate and carefully stated letter to the London *Times*, Mr. George Price, the M. P. for Devonport, gives an estimate of the relative strength of the navies of England and France, the ships actually building being included in the calculation. Vessels carrying guns of 43 tons weight and upward, and armor not less than 18 inches in thickness, are in the first class; ships with guns of 9 to 38 tons weight, and armor not less than 9 inches in thickness, are rated in the second class, and the figures stand as follows:

	Ships.	Guns. Tons.	Armor. Inches.
England.....	36	35	13
France.....	36	40	14½

From this estimate it will be seen that when all the ships now laid down are completed, England will be in possession of 36 first and second class fighting ships, carrying guns of the average weight of 35 tons—half of them being muzzle-loaders—and armor of the average thickness of 13 inches, and that France will be in the possession of the same number of ships, whose guns will average 40 tons in weight—all breech-loaders—with armor of the average thickness of 14½ inches. Mr. Price makes the pertinent remark that, in the event of a combination of France and Italy—a probability not, perhaps, very remote in cases of Mediterranean complications—England will find herself inferior to such an alliance in naval strength by 12 ships, although she has much greater interests to protect than those of France and Italy together.

Utilization of the Waste Products of Coke.

Considerable attention is being paid at the present time in England and on the Continent to the utilization of the waste products of coke-making. Mr. Bernard Samuelson, in his very interesting inaugural address as president of the British Iron and Steel Institute, touched upon no more important question than the utilization of these products. The amount of this waste almost surpasses belief. Mr. Joseph D. Weeks, in his report to the Census Department on the manufacture of coke, treating of this subject, estimates the value of the products lost in the manufacture of coke in this country as greatly exceeding the value of the coke produced. Dr. Siemens, in a paper read before the British Association, at its Southampton meeting, in August, 1882, estimates that 9,000,000 tons of coal were used annually in the gas works of Great Britain, producing, as by-products, 500,000 tons of tar, 1,000,000 gallons of ammoniacal liquors and 120,000 tons of sulphur. He also estimates the total annual value of the products of the gas works of the United Kingdom at £8,370,500, while the value of the coal used in these gas works was but £5,400,000. In other words, the value of the by-products of gas-making exceeds in value the coal used by nearly £3,000,000.

All of this immense weight and value of product, with the exception of the coke, is allowed to go to waste in coke-making in this country, and was for many years waste in Great Britain, but, as stated above, considerable attention is now being given to the utilization of these waste products, especially since the demand for the ammonia has sprung up in connection with the Solvay or ammonia process of making soda. Two systems are being tried in England—one, the Simon-Carré system, the other the Jameson. In both of these systems the condensable products of the waste gases are collected through a system of coils or their equivalents. The essential difference between the two systems is that the Simon-Carré requires the building of an entirely new oven, the oven being of the Belgian plan or a flue-oven, while the Jameson oven can be applied to the ordinary beehive oven, the operation of burning being reversed; the waste gases, instead of passing over the top, being drawn down through the coke, discharged at the bottom, and used before condensing to enrich the coke in other ovens. The great objection to the use of this process heretofore has been that the coke produced has been of an inferior character. Both Mr. Bell and Mr. Stevenson, who had tried the process in past years, testified at the meeting of the British Iron and Steel Institute at Paris, that the coke was an inferior blast-furnace fuel; that while there was no trouble in collecting the products, still, as a coking process it was not a success. This, however, seems to have been overcome by the Simon-Carré process, which has been in operation for some time at Messrs. Pease & Partner's colliery, at Crook, in the County of Durham. Here a quality of coke is produced which is fully equal, as a blast-furnace fuel, to that made in the ordinary beehive oven, without any attempt at the recovery of the by-products. In addition to this, the yield of the coal in coke is 75 per cent., as against 60 to 65 per cent. in the ordinary beehive oven, and there are also saved in addition 30 gallons of ammoniacal liquor per ton of coal, valued at 1d. per gallon at the ovens; 7 gallons of tar valued at 3d. per gallon, or both together, 4/3 per ton of coal, and this without considering the larger quantity of coke yielded, while the extra cost is only about 1/4 per ton.

It certainly is of the utmost importance to our coke manufacturers that they consider this method of the utilization of by-products. The literature on this subject in this country is not yet very full, but quite full statements as to the method pursued, cost, &c., will be found in the coke report of Mr. Weeks, to which we have already referred.

Whenever, as at Belleville, Ill., troops called out for the protection of life and property against riotous strikers fire upon a mob and kill one or more rioters, there is an immediate howl all over the country. The facts usually show that the shooting was justified on the part of the soldiers, but when troops are brought into requisition to suppress riots there is almost always great excitement, and some reckless fool is quite certain to furnish provocation for an attack from the soldiery. If soldiers are not needed at the point of disturbance, why are they called? If it is not expected they will need firearms for the preservation of order, why are they required to bring their arms with them? The truth is that soldiers should never be called upon to maintain order and protect property until the resources at the command of the civil authorities are exhausted. When troops are ordered out it should mean that they are sent to quell disturbance by the only means at their command. Our sympathies are with the citizen soldiery who are called out for this very disagreeable and thankless duty, and the responsibility for any rashness in their action seems to rest with the authorities, who may have sent them out unnecessarily. As the rule the militia do not use their weapons with unnecessary promptness on such occasions. At Belleville a mob of women held a body of men prisoners in a mine, while the striking miners held the proprietor of another locked up in a house under guard. Troops then made their appearance. A body of men armed with clubs and missiles of various kinds made a threatening demonstration; an order from the commander to halt was responded to by a shot from the mob which wounded one of the soldiers. The soldiers were not sent there to act as targets, and their charge upon the mob was the only thing they could do. There is really no occasion for any sympathy with mobs under such circumstances. But whether troops are needed or not is a question which the authorities must assume the responsibility of deciding.

American Shipbuilding.

Last Saturday a number of gentlemen of this city, including several well-known engineers, visited Captain Gorringe's shipyard, at Richmond, Philadelphia. They found four vessels in frame, ranging in size from a steam launch to a full-rigged ship of over 2000 tons register. About 400 men are employed. The company have contracts for seven vessels, and will complete two more contracts in a few days. One of these contracts is for a ship for Jacob Ridgeway, of Philadelphia. It will be 280 feet over all, 43 feet beam, and 23¼ feet depth of hold. It will have a carrying capacity of 3200 tons, the largest of any sailing ship afloat. A shop for the construction of marine steam engines is now being built, as well as a furnace in which the iron used in inaccessible parts of ships will be treated to prevent rusting. The yard, it will be remembered, was leased to Captain Gorringe by the Reading Railroad Co, the property having lain idle several years, though originally purchased and fitted up for shipbuilding purposes at an expense of about $1,300,000. With some repairs and additional machinery the plant is now pronounced well adapted to the objects of the American Shipbuilding Co., organized last spring through the efforts of Captain Gorringe, but there are some who question whether, with all his facilities, he will compete successfully with builders in England or elsewhere. He bases his expectations of success on the low price and excellent quality of American iron and the superiority of American workmanship, which are points well taken. Mr. F. B. Gowen, president of the Reading Railroad Co., on the occasion above referred to expressed himself in terms no less sanguine, claiming that we can build better locomotives here than in England, for less money, and that in shipbuilding "the proportion of the labor "bill to the whole cost of the completed arti-"cle is much more favorable." Much, however, as admitted by those directly concerned, depends on working the yard up to its full capacity, which is supposed to be the measure of greatest economy. Even if this condition is complied with, it may prove more difficult than Captain Gorringe now believes to turn out an ocean steamer of the average dimensions at the reduced cost of some $50,000, compared with the estimates of competitors for a vessel of the same description. At least there are grave misgivings on this point among practical machinists and iron workers. We are now in a fair way to learn the truth through actual demonstration. In any case there is reason for solid satisfaction that men of determination and adequate resources have at last come forward to substitute facts for theories.

Restricting Production.

The question of restriction of production seems to be one that at the present time is agitating the workingmen and manufacturers, not only of this country, but of England as well. In this country the nail manufacturers of the West for some months have been pursuing a policy of restriction which has resulted not only in keeping up the price of nails, but also probably in increasing the number of nail machines in existence. For some years it has been the practice of the window-glass workers to stop during the exceedingly hot months, July and August, which stoppage, though undertaken on account of the excessive heat, results really in restriction of production. A similar state of affairs is about to exist among the flint-glass workers, who have already given notice to the manufacturers that they will stop for six weeks from the first of July. The subject of a stoppage during the hot months in the year, ostensibly to avoid the extreme heat, but really, we believe, to bring about a restriction of production, and consequently the giving of employment to a larger number of men, has been mooted for some years by the Amalgamated Association of Iron and Steel Workers in the West, and they have several times made proposals to the manufacturers to consent to such a stoppage for July and August, and again this year it has been referred to. In England the pig-iron manufacturers, under the lead of the Board of Arbitration of the North of England, and other iron manufacturers, have endeavored to restrict the output of the mills, and have succeeded to some extent, but, as is generally the case in such attempts, there have been found some, where a large number is involved, who will break the agreement and begin work, so that restriction of the iron trade there does not seem to be very successful. The coal miners of Great Britain have also taken up the question of restriction, and have asked the Mining Association of that country, composed of operators, to confer with them upon the question of a restricted output, but the operators refused to meet them. The miners expressed dissatisfaction "at the "refusal of the employers to consider the "proposal of the men, a proposal which they "believe to be the only practical means of "maintaining a legitimate rate of price and "wages." The miners have called a conference for the 31st inst. at Manchester, "to "consider the whole question of output, and "to decide as to the steps to be taken in the "altered aspect of affairs."

New Orleans is exulting in the diversion to the Southern Pacific system of railway communication of "a large portion of Eastern consignments to the Pacific slope." This is claimed by a correspondent who possibly speaks of results hoped for, rather than results actually realized up to the present date. The Eads jetties have done much for New Orleans, by attracting Western grain shipments to the mouth of the Mississippi, so that already the exports of New Orleans are far in excess of those of last year to a corresponding date, and the grain traffic this year promises to be larger than ever before. Furthermore, the recent extension and consolidation of railway lines in Texas and along the Mississippi Valley is designed to bring to that market the cotton, sugar and other products of large and exceedingly fertile sections. But the direct through route from New Orleans to San Francisco, we are told, will surely control the movement of the vast products of California and the Pacific slope destined for European export, and this not so much because of lower freight charges as on account of extraordinary local facilities for handling and shipping freight. The average time between New York and San Francisco via New Orleans is represented to be 16 days, while the freight rate from the latter port to the Pacific is the same as from St. Louis, with the additional advantage of coastwise steamers to New York under the same management. In the estimation of New Orleans people, the importance of the new route to the Pacific cannot be exaggerated.

Forty-three years ago, William Wheelwright, of Newburyport, Mass., went to England to undertake the establishment of a steam navigation company in the Pacific Ocean. He had already spent six of the best years of his life arranging for steam navigation between the South American republics and had entirely failed in interesting capitalists in the United States. His company was at first limited in capital to £250,000, and in 1840 they commenced operations with two boats of about 700 tons gross register, although their actual freight capacity was not half that figure. They were only 198 feet long and 50 feet wide. Four new steamers were added in 1850. In 1865 the powers of the company were extended so that many other places were included in their lines. In 1856 all their steamers had compound engines. In 1867 they had a monthly line to the west coast of South America via the Straits of Magellan. In 1872 the capital was increased to £4,000,000. At present they advertise the sailing dates of 48 vessels. They own upward of 50 steamers with an aggregate of 120,000 tons and 20,000 horse-power. When we consider that the United States had on its list in 1881 only 83 screw steamers and 26 ironclads, this, it must be acknowledged, is a pretty respectable navy. We have not at hand particulars in regard to the profits, but the success of certain voyages made eight or ten years ago was so signal as to cause a large increase in capital, amounting to 25 per cent. or upward, which enabled more steamers to be put on and the lines of the company extended in very profitable directions. This is one of the remarkable instances where the far-seeing American pushed aside a most tempting business scheme and allowed his brother on the other side of the water, supposed to be less energetic and acute, to take the risk—and the profits also.

It is the fashion of those who find all their interest in railway matters to look upon the river and lake traffic of our country as a mere insignificant item, not to be compared for an instant with railway transportation. On the 6th of last month there left Louisville the largest single tow that was ever floated—so it is said. It consisted of 26,852 tons, or 694,000 bushels, of coal and 400 tons of hay. The towboat was the J. B. Williams. A Western newspaper calculates that this would load 2500 cars and require 100 or more locomotives to haul them, extending over a track nearly 18 miles long. As cars are loaded now, probably 1500 would do the work. The number of men employed on the tow was only about 25. This one steamer conveyed this enormous load to New Orleans, a distance of 1350 miles, in a week. The total value of the property, including steamer and barges for transportation, was only $125,000. The coal trade down the river is estimated as high as 4,000,000 tons, or 113,000,000 bushels.

It is taken for granted by most people that Bartholdi's statue when it is received will find a proper pedestal waiting for it, and that by means of a couple of derricks it will be safely set down in its proper place and the whole matter ended. It does not appear to be absolutely certain that the base will be ready when the statue arrives. The committee talk encouragingly, say they hope to have money enough on hand to pay the necessary expenses, and that everything will proceed smoothly. From an engineering point of view the task is not quite as easy as many persons seem to imagine, and we fancy that the cost of erection will be considerably greater than has been calculated. Under the most favorable circumstances it is not expected that a statue of sheet metal will stand up on its legs on top of a tall column of masonry without very material aid in the shape of internal stays and braces and firm connection with the pedestal. From what has been published it seems that the committee having the matter in charge have paid little attention to the mechanical part of the problem, and that even if they get a sufficient pile of masonry together in season, they may not even then be entirely out of the woods. Commander Gorringe's plan appears to be the most sensible yet, and, though comparatively cheap, will not cost a small sum of money.

The steamship inspection law passed by Congress last year appears to be working well. Thus far about 200 steamers have undergone the required examination, and there is reason to believe that many lives have been saved and heavy pecuniary losses averted. Steamships carrying passengers are no longer permitted to leave port partially disabled, or deficient in their equipment, with the object of having repairs and disbursements made on "the other side." If steamers are found unseaworthy, they are not allowed a clearance until the master makes an affidavit that he does not intend to carry passengers. Those sections which apply to "ocean tramps"—steamers which have no regular departures or ports of destination—are particularly advantageous, but it has not been unusual in the past for steamers damaged in their engines, or otherwise seriously crippled by the loss of masts, boats, &c., to sail for home without repairs. The fact has become notorious that a large percentage of those steamers in the Atlantic trade reported "never heard from" were eastward bound. As the law is now enforced, steamers are likely to be branded for what they are worth, so that unwary passengers may not be lured to destruction under the temptation of cheap tickets.

The rumored failure of certain prominent iron firms in Pittsburgh, which was telegraphed in a sensational manner all over the country, and which created widespread alarm, seems to have had no foundation in fact, though there was a certain basis for the report. It seems that Graff, Bennett & Co. and Robinson, Rea & Co., the parties referred to, are partners, with others, in the Graffton Furnaces, at Leetonia, Ohio. These furnaces, or the company operating them, which is known as the Graffton Iron Co., though really, we understand, only a partnership, asked an extension of their paper, and the inference was at once drawn that the partners were so involved that their failure was imminent. It is understood, however, that this is not the case, and that these firms are sound. They have made such statements to the banks as satisfies them of this fact. It is reported that these statements showed that Graff, Bennett & Co. had assets enough outside of their mills, furnaces and other real estate to much more than pay all their indebtedness, and that their real estate was free from all encumberances.

Rail-Cambering Machinery.

BOSTON, May 30, 1883.

To the Editor of The Iron Age—DEAR SIR: My attention has been called to an article in your issue of May 24th, illustrating the cambering apparatus at the works of the Lackawanna Iron and Coal Co. As the inventor of the six-roll cambering machine and other mechanical movements for handling rails, from finishing rolls to cold press, known as the "Gustin Rail-Straightening Process," now in almost universal use in this country, and to some extent in Europe, I trust that you will afford me space in your paper for a few words, which may be of interest to some of your readers.

Having built the first automatic cambering machine ever used in the manufacture of rails (some 10 years since), and also having furnished the original plans from which all the cambering machinery in the country has been constructed, including the original designs for the Lackawanna Iron and Coal Co.'s apparatus, besides many European mills, it had been generally supposed that I was the inventor until the claims of Mr. Seaman appeared in your paper. Presuming that a fair criticism of my own invention as constructed by another engineer will not be objectionable, I may commence by saying that the general plan of machinery, as shown in your illustrations, is almost precisely the same as shown in my drawings furnished the company, and now in general use throughout the country. The only alteration is in the position of the shaft J and the pulpit V, the latter being generally placed in front of the saws, as there it commands a better view of the work. The shaft J in your illustration is in a position which makes it less accessible than the corresponding shaft in other mills. Proceeding to the details of construction and the consideration of Mr. Seaman's claims:

1. There never has been any trouble in the maintenance of parallelism between the axes of the rolls of the cambering machinery now in general use, and, as the driven rolls in Mr. Seaman's arrangement must be adjustable by screws, or else be allowed to wear out of line, I see no particular point in his first claim.

2. Dispensing with the necessity of having different sets of change rolls for the various sections of rails would, no doubt, be an advantage, but it is questionable if that advantage is gained by the arrangement shown. It is true that Mr. Seaman's rolls may be all of one size, but, as the surfaces of the rolls must be kept in perfect condition, the change of rolls must necessarily be frequent in any machine, and in the machinery under consideration must consume a large amount of time, as the heavy top plate must be lifted, replaced and adjusted for each change, whereas in the machine in general use the change can be made in 10 minutes or less, and, as the modern rail mill is constantly in operation from Monday morning until Satur-

day night, even an hour's loss of time is of serious consequence.

3. The arrangement for adjusting the rolls to vary the camber of rails is certainly no improvement. In the standard machine the adjustment is made by screws against the upper bearings of the two middle rolls, and, as the slightest movement of the screws will effect the desired object, it can be done instantly and with absolute certainty. In my opinion the fatal defect in the cambering machine as constructed by Mr. Seaman is in allowing the middle or fifth roll to revolve around the spindle instead of in fixed bearings. It must be obvious to any mechanic that the hole in the roll will wear larger and the spindle smaller; the slightest difference in the diameters of these two will cause an unsteady motion of the roll, which will increase with the wear, and, when it is considered that the camber of the average rail section does not exceed $\frac{1}{100}$ inch per foot of length, it will be seen that the slightest eccentricity of the roll will cause a variation in the camber and make additional work at the cold press. Of course, there are various expedients which may be resorted to to lessen the wear of parts, but the defect will still remain, and time will show the necessity of change to better construction.

4. The cambering machine as constructed from my plans is made perfectly rigid without the objectionable top plate, and rails may be and are cambered with such perfect uniformity that very few and light blows are required on the head or flange of the majority of them to make them ready for the track; the slight variation in the camber is caused by the shrinkage of the rail section, owing to loss of heat, and not by the want of rigidity in the machine. The variation of the $\frac{1}{1000}$ part of an inch in the height of the rails passed through will cause a very perceptible difference in the camber. As to the wearing parts, I may say that the last machine put in operation (at the Washburn Iron Co.'s works, Worcester, Mass.) has already cambered about 25,000 tons of steel rails, and from present appearances will camber as many more, without costing $1 for repairs.

5. Mr. Seaman claims a minimum of labor for operating, but as the apparatus has been operated for years in many mills with but one workman, it is difficult to see his improvement in this respect.

6. The general plan of machinery, as shown, is undoubtedly good, but the minimum of necessary driving gear is not attained, as the apparatus for the St. Louis Ore and Steel Co., St. Louis, Mo., and the same for the Cleveland Rolling Mill Co., Cleveland, Ohio, have both been completed within the last two months, and either of them contains less gear, less shafting and less mechanism generally, and is of very much more simple construction, than the plant of the Lackawanna Iron and Coal Co., and as for effectiveness, it would be quite a simple matter to handle rails at the rate of two per minute with either of them.

7. Coming now to the machine for taking vertical kinks out of the rails (marked Fig. 5 in your illustrations), there is nothing new about this machine, excepting the complicated system of levers shown for adjusting the rolls, whose value would be entirely lost as soon as the bearings of one roll had worn the $\frac{1}{100}$ part of an inch more than the others, and would remain so until the whole system was readjusted; this part of the apparatus, as shown in your illustration, was no doubt original with Mr. Seaman, although drawings of a similar machine were made long before the Lackawanna Company's apparatus was built; but I have never urged its adoption, because later experience has proved that the machine is entirely valueless for the purpose for which it was intended, as it is quite a simple matter to deliver rails on the bed entirely free from vertical kinks without the use of such a machine.

There are many other faults about the machinery which must be so evident to all practical railmakers that it would be useless to take up more of your valuable space by further criticism. As a whole, the apparatus is not up to the standard, and shows want of experience, and before it can be kept in continuous operation to handle the product of a modern rail train, say 100 rails per hour, much of the complicated mechanism will have to be removed.

The cambering machine was originally designed with three rolls only; a second roll was then added at each end, making five; the sixth roll was then added to provide for cambering rails in either direction, as it was the custom before the cambering machine was introduced to finish rails with the flange on either side. The sixth roll also answers another and very important purpose, namely, it sometimes happens, from want of skill or attention on the part of the finisher, that rails are delivered from the finishing rolls with a slight twist, which cannot be removed at the cold press, but with the six-roll cambering machine, all the rolls being properly adjusted, it is utterly impossible for the rail to get through the machine without having the twist entirely removed.

Respectfully, A. J. GUSTIN.

Direct Processes.

To the Editor of The Iron Age: Perhaps you will allow me space for a few further remarks in explanation of my article on "Iron Made from Magnetic Sand by the Siemens Direct Process," and your editorial comments thereon in your issue of May 24.

There is no disputing the fact that all direct processes so far have been more or less failures from a commercial point of view. The reason of this, however, appears to me to be, not because Siemens and others in their direct processes endeavored to produce bar iron from the hammered bloom, but because they attempted to produce iron from ordinary low percentage ores, which I maintain can never be successfully employed, from a commercial point of view, in any direct process, without the intervention of the blast furnace.

In treating ordinary ore there are two things to be accomplished. First, the removal of the solid impurities that they contain, such as silica, alumina, &c., with fluxes in the form of slag, and, secondly, the deoxidation of the oxide of iron in the ore to metallic iron. Now, to effect this double process there is no doubt that the blast furnace is the best and most economical furnace yet invented; but its drawback is that the phosphorus and sulphur are intimately mixed with the iron produced, besides the addition of silicon and carbon. If the removal of solid impurities is attempted in any of the direct processes yet invented, a highly acid slag is formed; that is to say, containing a far higher percentage of iron than the blast-furnace slag; therefore the produce of metallic iron per ton of ore always will be, and must be, far less than that from the blast furnace. If, however, a pure ore can be obtained—that is to say, containing no solid impurities, but only oxygen, then the question is a very different one. The conversion into metallic iron consists only of the second process accomplished in the blast furnace, or the deoxidation of the ore and conversion into metallic iron. There is no slag formed, and nothing, therefore, to rob and remove the iron the ore contains.

Now, with the magnetic iron sand, Edison's process for cleaning it and giving a pure magnetic oxide practically accomplishes all that is done in the blast furnace, so far as the removal of the solid impurities is concerned, at a much less cost, and without the drawback of injuring the quality of the metal by mixing phosphorus and sulphur through it, and intimately incorporating silicon and carbon, which are afterward removed with so much difficulty. As to the commercial question, large quantities of this magnetic iron sand can certainly be obtained from the deposits on the St. Lawrence River, Canada, at a less cost, delivered, than the best magnetite (such as Republic ore, now so largely imported into Pittsburgh by way of Cleveland), and also containing fully 10 per cent. more iron than these ores. There is no question about the Edison separator now doing the work both in quantity and quality. During the last two weeks I have had the pleasure of being requested by Mr. Edison to carefully examine an improved separator set up at the Goerck street works, and which was shown to me in full operation. The separation is about perfect. One sample taken personally, as delivered from the separator, showed a total impurity as low as one-half of 1 per cent. only. If such an ore as this can be delivered at a less price than Republic ore, there cannot be much question about the eventual success of direct processes, and owing to the phosphorus and sulphur being absent from the ore the quality of the metal produced must be equal, if not superior, to the finest Swedish iron for crucible steel and other fine purposes.

In conclusion, I would just remark, as to the consumption of coal in the Siemens direct process, that it will be obvious that the purer the ore used the less fuel will be required; first, owing to the fact that the yield with the pure ore will be so much greater, and the coal will not be wasted in producing slag, so largely present when ordinary ores are used, and entirely absent with pure magnetic sand. W. J. MENZIES.

To the Editor of The Iron Age: In your recent article in which you present the merits of the Danks-Bouvard mode of puddling pig to blooms, you state: "We know that in the blast furnace there is no loss." Theoretically, this is no doubt correct. Practically, from irregular working and various causes, the quantity of metallic iron in the pig for the entire run of a blast I did not suppose equaled the average metallic iron in the ore used. I am glad to be set right in this respect.

Again, in stating that the Danks-Bouvard makes 2240 pounds of iron with 1161 pounds of coal, you omit a ton of coal or more that was consumed to bring the ore to pig, and thereby a wrong impression might easily be conveyed as to the entire fuel required from ore to bloom by this method, which is probably not less than 1¼ tons. As you omit all reference to the waste by the Danks-Bouvard, it might be assumed there is no waste. The fact is, however, that the cinder is of the same chemical combination and substantially equal both in quantity and quality to ordinary puddle cinder, which you estimate at 8 per cent. The majority of manufacturers would perhaps make the average waste in puddling 9 or 10 per cent.

You overlook the increased repairs to furnaces where this sharp-cutting cinder is constantly revolved over a lining which naturally becomes more or less softened by the high blast and intense heat so necessary to weld the iron. This is understood to involve large cost and frequent delays for repairs. By my method the molded masses, resting stationary on the hard cinder bottom, protect it, so that the bottom is never damaged.

You state that the Danks-Bouvard reduces phosphorus from 0.82 to 0.082. Frequent analyses have proven that by my method, with inexperienced operatives, seven-eighths of the phosporus is got rid of, whether the metal-bearing material contains 3 per cent. phosphorus or .30 per cent. or less.

In asserting in my last that direct blooms may be produced close to the cost of pig iron with a properly located, arranged and systematized plant, conditions were claimed to which any mode of manufacture is entitled in order to insure success. Hitherto my operations have mostly been conducted to a disadvantage, in ordinary puddling furnaces, with the fuel at one end. In such furnaces the necessity for frequent firing renders it almost impossible to prevent needless oxidation, and therefore in such furnaces the highest possibilities of this system have not been fairly attained. Nevertheless, in these furnaces it has been customary to produce a ton of very clean iron rolled to bars, seven-eighths dephosphorized, from about three tons of mill cinders, which, being chemically combined so largely with silica and phosphorus, are much wasted. With rich ores the same results have been attained with something over two tons of ore.

Every new mode of working demands its own special arrangements in order to secure the best results. In regenerative gas furnaces tests have been made of my method, where a high reducing flame with outward pressure has been uniformly maintained, and then the waste of metallic iron has been brought below 10 per cent. With skill in managing the flame of a regenerative gas furnace, so as to preserve the proper temperature, I believe the loss of metal will be

brought very much below 10 per cent. This will only be attained by the operator after experience, observation and systematic working. The success of the process in securing the closest yield depends, perhaps more than anything else, upon the quality of heat, and this it has been proved is no more difficult to arrive at than in any other mode of manufacture.

Although lean ores and mill cinders are readily worked by this system, as explained in my last, rich ores crushed and separated are undoubtedly best, in order to return the most profit by yielding a quality of metal fitted as well for fine steel as the best Swedes iron. Nor will this mechanical separation in the end, with suitable appliances, perhaps, be found more costly, on the whole, than blast-furnace precipitation by fire. The Atlantic Copper Co. last season, as stated in their report, crushed and separated 189,000 tons of hard copper rock, containing only 19 pounds of mineral to the ton, at an average cost of 37 7-10 cents per ton. At this rate magnetic ores containing, say, 55 per cent. metallic iron, can be prepared up to 69 or 70 per cent. at a cost of about 75 cents per ton. Less than 1¼ tons of such ore will be likely to make a ton of blooms of very pure iron in regenerative gas furnaces maintained at the properly understood temperature. As it has been proved by practice that these rich ores, mingled with now wasted anthracite or coke dust and mechanically molded, need no furnace labor whatever from the time of charging until, in three hours or less, they become masses of iron, suitable, when squeezed, for the finest crucible or open-hearth steel, avoiding the expense of a blast-furnace plant, the economy of this process, in a properly systematized works, would seem to be apparent.

CHARLES M. DU PUY.

The Henderson Gas Furnace.

The main features of this furnace were described and illustrated in *The Iron Age* of October, 1874, and in the *Metallurgical Review* of February, 1878. Since then Mr. Henderson has made some improvements in the details, by which he claims to attain as complete a utilization of fuel as is possible, together with the generation of the highest heats practically required. The furnace is direct acting—i. e., the gas producer adjoins the furnace, and delivers the hot gases into it through a neck which is divided into two vertical flues, in which are tuyeres through which heated air is delivered to the gases in the flues, and mixes therein with them before they impinge on the metal or substance to be treated on the hearth of the reverberatory chamber. The ashes and clinker in the coal are removed by fluxing and tapping them as cinder from the hearth, as in blast-furnace practice. This keeps the fire always clean and free of ashes in the producer, and enables uniformity of quantity and quality of the gas produced at all times. The flux is so chosen that the cinder carries three parts of silica, two parts of lime and one part of alumina. The producer is fed with air by a distinct blast machine from that which supplies the air to burn the gases, so that working the furnace is a process of producing heat which consists in fluxing the earthy matter of the fuel in a gas generator with suitable flux, and feeding a measured volume of air to incandescent fuel for generating gas, and at the same time supplying the gas thereby produced with a measured volume of air in the proper proportions to produce a flame of the chemical quality desired.

The flame is oxidizing when it contains an excess of air over that required for perfect combustion, and molten gray iron is converted to wrought iron by it alone, and white cast iron is decarbonized to wrought iron in it without melting. It is neutral when the exact amount of air for perfect combustion is used, and high temperatures are obtained which enable iron to be produced free of carbon which is poured from the hearth into ingots; it is reducing when insufficient air is used to promote perfect combustion which enables the melting of foundry iron, and keeping it a long time in the furnace in a fluid condition without its losing or changing the carbon from the graphitic to the combined state. When a reducing flame is used the carbon remaining unconsumed in the flame is afterward consumed in an adjoining chamber by the further admission of air, which also burns the carbonic oxide given off from cast-iron when an oxidizing flame is used. In the combustion of mixed gases hydrogen burns before carbonic oxide, and if enough air is not supplied for both, all the hydrogen burns and a portion of the carbonic oxide remains unconsumed; this enables control of the furnace and processes used in it when a reducing or carbonizing flame is used. It is necessary, in order to effect the perfect combustion of carbonic oxide, to burn it in admixture with one-third its volume of hydrogen, and with fuels that contain but limited amounts of it. Steam is introduced in a measured quantity in the producer to make it.

The flame is changed from oxidizing to neutral or reducing instantaneously by regulating the blast machine which supplies air to burn the gases and is under perfect control. The hearth of the furnace is movable and revolving, and is mounted on a rotary platform which can be raised into position by hydraulic power. A sand box is used for sealing the joint. The hearth makes three to four revolutions per minute. By lowering the platform, four wheels with which it is provided rest on a track, over which it can be drawn out sideways. The inlet and outlet flues of the furnace are the parts most affected by the heat, but as they are accessible from the outside no more time is required to repair them than with the outlet of a common puddling furnace; the roof is very slightly affected by the heat, as the flame is delivered vertically into the hearth.

The spent gases from the furnace hearth pass to a heating chamber adjoining, and thence to a boiler, which produces more steam than is required for the blast, pumps, &c. Underneath this boiler are arranged along the walls cast-iron pipes for heating the air for burning the gases. An experimental furnace has been built at Bellefonte, Pa., of 2½ to 3 tons capacity per charge. It was principally built to test its performance as compared with the Siemens regenerative furnace. Mr. Jonathan Jinks, steel melter, of the St. Albans Steel Works, St. Albans, Vt., gives the following record of an operation of the Henderson direct-acting furnace with the Martin process:

May 1.—1 p. m.—Furnace lighted, using one-sixth of a cord of wood. 4 p. m.—Blast put on. The furnace was heated with coke for 12 hours during the night, to keep the producer hot and enable the men to rest.

May 2.—4 a. m.—Furnace charged with gas coal. 8 a. m.—Furnace hot. 12 m.—Began making sand bottom. 12 p. m.—Bottom made. Furnace idle 4½ hours.

May 3.—4.30 a. m.—Charged metal. 9 a. m.—Tapped out the heat. This makes a total of 44 hours, from which 16 hours must be deducted, leaving the actual working 28 hours. The charge referred to was: 1000 pounds No. 2 Bessemer pig, 600 pounds of steel scrap from the former heat, 300 pounds of wrought scrap, 30 pounds of ferromanganese and 220 pounds of Lake Superior ore. Mr. Jinks estimates the waste at 6 per cent. An analysis of the metal for carbon and phosphorus by Mr. W. M. Habirshaw, analytical chemist, of 159 Front street, New York, gives: Carbon, 0.0014 per cent.; phosphorus, 0.1528 per cent.

Mr. Henderson's furnace, which has been patented, seems well designed and likely to supply the want of an economical furnace which will produce ingot iron as a substitute for puddled iron. The cost of fuel is stated to be 3 cwt. per hour for the 2½-ton furnace.

The Channel Tunnel.

The London *Telegraph* gives the following interesting particulars of the progress of the Channel Tunnel:

A tall shaft, a steam engine, an air locomotive and a couple of wooden shanties mark the spot destined, it may be, to abut upon the English mouth of the Channel Tunnel, or rather, of a Channel tunnel—for there are other schemes afoot to join London and the extremest point of the Continent of Europe in a continuous railway journey and without change of carriages. Sir Edward Watkin airily calculates that the cost of the enterprise in which he is interested would amount to £3,000,000, and that the tunnel would allow the passage of 250 trains each way every day, at an average speed of 45 miles an hour, so that the tunnel of 22 miles in length might be traversed in half an hour—a speed, be it said, very much higher than that kept up in the longest tunnels of the St. Gothard between Switzerland and Italy. At the bottom of the shaft, at the mouth of the boring, no more than 7 feet in diameter from end to end—excepting here and there a somewhat wider square opening, technically called a "turn-out"—we found a couple of trollies, fitted with seats on either side, after the manner of the tram-cars of the military train familiar to *habitués* of Wimbledon camp. Running along the sides of the trolly, close to the ground, was a footboard like that attached to a railway carriage, and above the seat was a semi-circular hood, lined with red baize, sufficient to protect the head and shoulders from dripping wet or particles of falling *débris*, but not wide enough to save the legs and feet. By reason of the space taken up in the lower arc of the circle, so as to make a level floor, along which the rails were laid, it was necessary that we should sit with knees drawn up and heads bent during the whole time occupied in journeying to the face of the tunnel and back again. A Rembrandt or a Salvator Rosa might have done pictorial justice to such a scene. Under foot for a great portion of the way the ground is almost ankle deep in slush, and the stalwart fellows who drag and push the trollies—trudging manfully along—have enough to do to keep their foothold. The travelers, for the greater length of time moving through a dim twilight, cannot well make out the features even of those who sit beside them. Now and again the little electric lamps, set in rude niches of the naked gray chalk, cast a brilliant but fugitive light on the passing train. There are shadows above and beneath and all around. Looking backward or forward, through the deepening gloom, the traveler sees an ever-receding, seemingly endless funnel-shaped perspective, lit at long intervals as with fiery eyes. Onward, and yet onward—to no sound save the splashing made by the tall workmen tramping through mud, and the drip, drip of the water upon the hood above our heads—we are dragged and pushed beneath the shingle and the sand of the shore, for a time level with the beach, and then down, a quarter of a mile deep, past low-water mark, under the bed of the channel.

The bore has cut clean through the gray chalk in a circle as round and true as the inside of a wedding-ring. So thoroughly, indeed, is the instrument adapted to the work and to the material that in dry places it is possible to see the chisel marks made a couple of years ago. At intervals along the route, where it is feared the water might come through, the sides and roof have been packed with lead or clay, and held up with solid iron bands, apparently about 18 inches wide. Sometimes, in the fitful flashes of light, the eyes rests upon falling red rivulets, like streams of blood, pouring down the damp walls. Ever and anon there are "faults" in the clayey chalk not yet remedied. So we go on and on, seconds seeming as minutes, until the electric lamps cease altogether, and the long, awful cave is enveloped in a darkness that would be impenetrable but for the glimmer of a few tallow candles stuck into the bare walls of the cutting. Even a mile and more from the mouth of the shaft it is not difficult to breathe, for the same machine which works the bore pumps drives a continuous supply of fresh air into the 7-foot pipe, which at present forms no more than the nucleus of a tunnel.

At a distance of 2300 yards from the pit mouth we come upon the simple and wonderful piece of machinery which can pierce through the bed of the sea with extraordinary celerity and at a cost cheaper than is required for the making of an ordinary tunnel under a hill. By permission of the President of the Board of Trade, the engineer is allowed to make a couple of turns in order to show our party the method of its working. Presently we remount our not too comfortable carriage and pass stooping once more along the fearsome, narrow way; pass by spaces of horrible shadows and glimpses of welcome light, and finally we are swung up through the shaft into the outer air, where the glad sunshine catches the tall cliff's face and bathes the smiling and yet unbetrayed channel in an atmosphere of golden glory.

New Letter Copying Bath.

The universal practice of copying correspondence, invoices and other documents gives importance to the facilities employed in the office for accomplishing this object. The principal point in copying a letter is to dampen the sheet or leaf uniformly. The more perfectly this is done the better will be the copy. Whatever will do this the best and in the shortest time is the article demanded in well-appointed offices. The old-time device—a flat brush and a bowl of water—is rapidly giving way to improved facilities. One of the most recent to which our attention has been called is illustrated in the accompanying engravings, and is the invention of Mr. N. C. Stiles, of the Stiles & Parker Press Co., of Middletown, Conn. The inventor claims for this device that it meets the requirements of a modern office as stated. The article was first made for use in the office of the company above named, and was not intended for sale, but many customers of the establishment having seen it in use, were pleased with it, and entered requests for duplicates. Accordingly, the patterns and forms were perfected, and when the press had been brought out in desirable shape it was put upon the market and has already received many flattering testimonials from those who have employed it. The general process involves the use of copying letters with cloths, which is by no means new. The device here described was the result of efforts to overcome the disadvantages of using cloths in the ordinary manner. The first improvement made in developing this device was the use of a common wringer fastened to a board, with a pan to hold the water. The next step was a cast-iron box that was galvanized to prevent rusting, and to which the wringer was fastened at one edge. This arrangement, however, was somewhat suggestive of washing day, and therefore was not a desirable piece of office furniture. Finally the present form of the apparatus, shown in the accompanying engravings, was arrived at, which is a convenient and durable arrangement for the purpose. It is also one that is ornamental. The parts are made of cast iron enameled on the inside and handsomely japanned and ornamented on the outside. The apparatus is therefore practically indestructible. It is supplied with a cover which protects it from dust when shut and serves as a receptacle when open for cloths as they are pressed between the rollers. The size of bath is 10 x 13 inches, but larger cloths can be used by folding. Among the advantages pertaining to the use of apparatus of this kind may be mentioned the celerity with which the work can be done. While the old method of using water with a brush and removing the surplus with a blotter does very well for a small number of letters, the blotter soon gets full, leaving the sheet or leaf too wet. With cloths, any required quantity are kept in the water when not in use. When pressed between the rollers, either one or a larger number at a time, the cloths are left uniformly damp and in the most desirable condition for copying purposes. By using thin cloths which take up but little room in the book, from 1 to 40 letters may be copied at a time, two being copied with each cloth. Referring to the illustrations, Fig. 1 shows the copying bath open, with a receptacle underneath for oiled sheets 10 x 13. Fig. 3 shows the copying bath combined with the press operating with a lever. Here the hood is shown closed down in the way the press would be left when not in use. A receptacle for the oiled sheets the same size is provided in it. Fig. 2 shows simply a copying bath without press or receptacle, a form in which this device is occasionally demanded in offices.

New Letter Copying Bath.—Fig. 1.—Copying Bath Open.

Fig. 2.—Copying Bath without Press or Receptacle.

Fig. 3.—Copying Bath and Press Combined.

An Important Decision Against the Washburn & Moen Interest in the Barbed Wire Litigation.

On the 4th inst. Judge Treat, in the United States Circuit Court at St Louis, rendered a decision of the greatest importance in the barbed wire litigation. The Court holds that the patents issued to Kelly & Glidden are void, and therefore refused to grant the preliminary injunction asked for by the Washburn & Moen Mfg. Co. and Isaac L. Ellwood. The Washburn Co. likewise sought an injunction against Gustav Griesche and Henry Fuchs relative to the manufacture of patent machines for barbed wire. This injunction was refused, on the ground that there was no infringement. The earliest barbed-wire patent was issued in 1867 to one Hunt, since which time the issues and reissues have been almost innumerable. All of these, or at least all of them that possessed practical business features, have been from time to time acquired by the Washburn & Moen Mfg. Co., of Worcester, Mass., and Isaac L. Elwood, of De Kalb, Ill., the plaintiffs in the cases referred to. Of all the numerous patents the only practical ones are those known as the Kelly and Glidden patents, the original issue of which, as claimed by the defendants in the suits, has been enlarged and amplified out of all knowledge by subsequent reissues. It is precisely here that the controversy takes place and where the battle has been fought out. If the reissues are declared to be within the meaning and intention of the original patents, or if they are, in other words, valid, the defendants would have been guilty of infringement. If otherwise, and the courts declare the reissues vitally at variance with the original patents, and invalid, the business of manufacturing barbed wire must be thrown open without restriction.

About two years ago, by a decision of the United States Court in Chicago, the Washburn & Moen Co. were given the sole control of all barbed-wire fencing made in the United States under a reissue of the Glidden patent, which included every kind of sharp-pointed metal or wire fence for the purpose of inflicting wounds upon animals and preventing them passing the line of a fence. By this decision the Washburn & Moen Co., who are assignees of Glidden's patent, acquired what is known among dealers in barbed-wire fences as the "broad claim"—a complete monopoly of barbed-wire fences. Licenses were issued to other companies, permitting them to manufacture and to vend the fences under condition that they would pay a royalty on all wire sold and would not sell below a fixed price. Subsequent to the decisions in Chicago in the Haish and similar cases, the Supreme Court of the United States rendered two decisions which appeared to entirely overturn the basis on which the Chicago case rested. These decisions were on entirely different subjects, but went to the principle of the right to embody in a reissue of a patent matter not expressly claimed in the original. This set the defendant in the present cases on inquiry, and the result was the establishment, both in St. Louis and in Iowa, of factories for the production of barbed wire. Suit was instituted first against the Iowa defendants, and an injunction asked to restrain them from further operations. These cases were augued last winter at Keokuk before Circuit Judge McCrary and District Judge Love. The decision was reserved. Subsequently eight suits were brought against the St. Louis defendants—namely, three against the Simmons Hardware Co., two against Fuchs, two against Gates and one against Griesche. These are the cases just decided. The subordinate question of the validity of the patents on the machines is decided against the Washburn & Moen interest. We are not advised whether an appeal will be taken to the United States Supreme Court. We should think, however, that there was very little promise of advantage in an appeal if the fact of the extension of the claims of the reissues is established, the Supreme Court having clearly established the principle that the only object of a reissue is to afford an inventor an opportunity to narrow his claims, and that by broadening them the inventor surrenders his original patent and gets in return one which has no value whatever, even as relating to the subject covered by his original surrendered patent. The question whether the claims have been broadened or not in the Washburn & Moen reissues is simply one of fact.

Bridge Building in New Brunswick.—The project of building an iron bridge across the St. John River at its mouth, for the use of railroads East and West, is likely, it appears, to be carried out, work having been commenced a few days ago. The company incorporated for the purpose of bridging the river are considered to have a good thing, the way, financially speaking, being made smooth by the Dominion Government. The work, it is estimated, will cost in the vicinity of $600,000. The annual revenue in tolls collected from roads using the bridge is expected to amount to $20,000; the St. John and Maine Railroad gives a bonus of $5000 a year, and the New Brunswick Government a subsidy of $9000—in all, $34,000—to meet estimated annual charges, maintenance, interest, &c., amounting to $31,000. The Dominion Government has agreed to advance 80 per cent. of the cost, and the bonus and subsidy amounting to $14,000, being exempted from lien, the only lien it can have on the revenue will be on the actual tolls. The Government also reserves the privilege of purchasing the work, and that within five years from the date on which the first advance is made, on payment of the difference between the amount then due to the Government for advances and interest, and the sum of the total amount expended by the company and 10 per cent. on the total amount so expended. In case the bridge is not finished by March 25, 1885, the Government will take the work and finish it itself, upon paying to the company the difference between the amount then advanced and 80 per cent of the cost at the date of entry. Under such favorable conditions the work can hardly fail. When it is finished there will be an unbroken railway line between New York and Halifax.

Electrical Patents.—Those who are tempted to buy patents relating to electrical apparatus would do well to acquaint themselves with the "state of the art," as shown by what has already been accomplished. The electrical inventions for 1882 sum up as follows at the Washington Patent Office:

Electric lighting	258
Telephonic apparatus and appliances	141
Magneto and dynamo electric machines	110
Conductors and cables	86
Batteries	54
Regulators and governors	54
Switch-boards and circuit closers	52
Miscellaneous applications of electricity	49
Telegraph apparatus	45
Receiving telephones	36
Transmitting telephones	29
Annunciators, indicators and recorders	27
Duplex and quadruplex telegraphs	26
Railroad signals	26
Electro-magnets and motors	23
Alarms and signal bells	22
Systems of telegraphy	17
Electric gas lighting	16
Printing telegraphs	15
Fire alarms	15
Lightning rods and arresters	12
Insulating materials	11
Therapeutics	10
Burglar alarms	8
Electric clocks	7
Magnetic grain separators	5
Total	1,153

It will be seen from the above enumeration, in which the numbers are arranged in a sliding scale, that electric lighting is now the most popular subject for invention, telephonic appliances taking the second place a long way down the scale, and electricity generating machines coming in an easy third.

English artillerists are coming to the conclusion, long since reached in this country, that it is possible, by proper attention to the manufacture of gunpowder, to obtain almost any pressure which may be desirable, whether high or low, in the chamber of the gun, and to maintain this pressure until the moment when the shot leaves the muzzle. In this way it is possible to reduce the strain on the gun to a minimum, while the pressure on the shot is kept up until the last moment. Count Rumford was the first who ascertained by experiment that the action of powder was little less than that of a sudden blow, and as the shot started into motion, the propelling force fell off until at the muzzle it was a mere nothing. We have forgotten who in this country first found that the explosive effect might be greatly reduced while the propelling impulse was made continuous. The English are now adopting a hexagonal form for grains of gunpowder, very similar to that which has been tried in this country, and, it is said, are getting good results from it.

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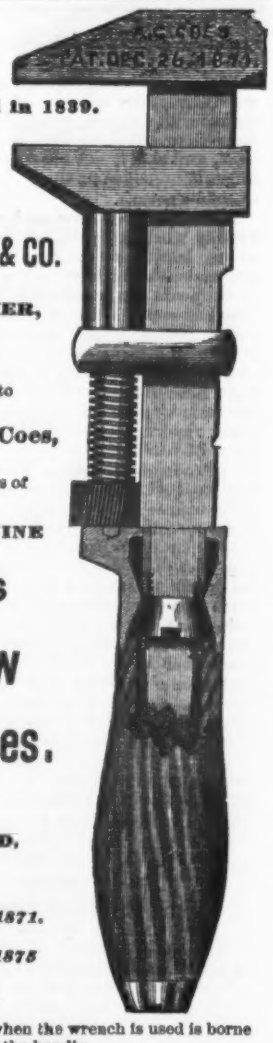

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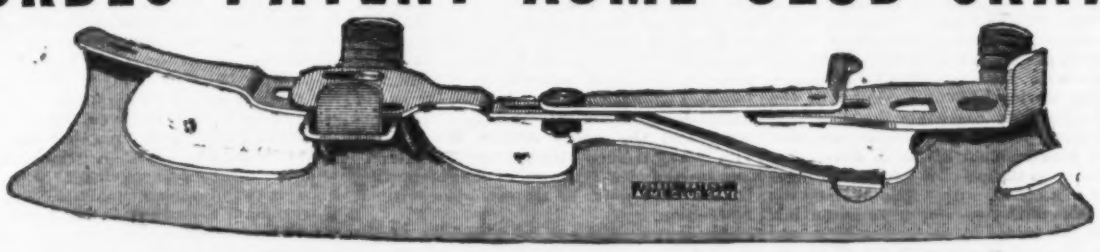

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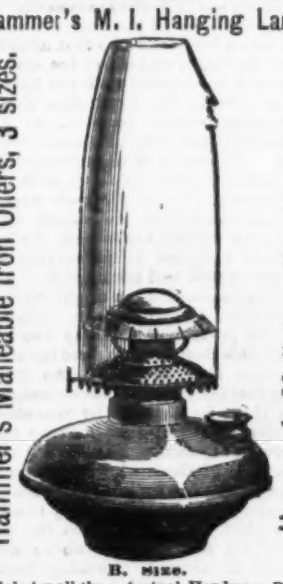

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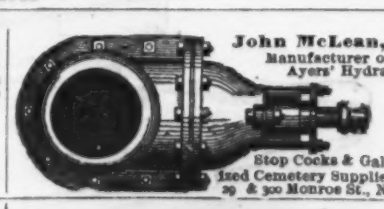

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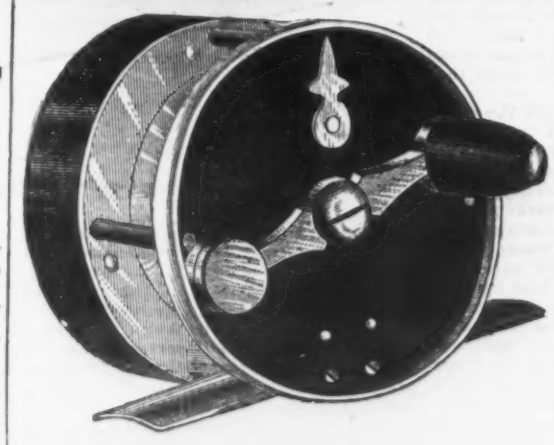

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Fire Organizations in Manufactories.

Annually scores of buildings are destroyed by fire, says an exchange, for the lack of well-directed efforts in the attempt to stay the conflagration. System and unison of action are essential in combating fires, and yet how rarely are these requisites found in such cases, except it be in cities having a paid fire department. All manufactories are peculiarly liable to destruction by fire, and hence every precaution should be taken to prevent such a calamity. This is seemingly a very simple proposition—the mere statement of a self-evident fact; but it is one of those truths which are neglected when the matter of their practical application is considered. True, many manufacturing institutions are well provided with fire extinguishing apparatus, but rarely are these articles brought into successful requesition in times of need, because in such cases the men at work lack system or organization, and often in the confusion of the moment they are actually a hindrance rather than an assistance in the extinction of the fire. At such a time system is everything. Well-directed efforts can accomplish wonderful results in fighting fire, but experience shows that a large proportion of men during the excitement of combating a fire lose their heads and do the very things they should not do. Manufacturers can easily guard against such a misfortune by organizing their men in companies and instructing them how to act in case of necessity. They should be drilled the same as any fire company. Every man should have his place and should understand his duty. A perfect and thorough system once established, but little care would be required in continuing and perfecting the organization. Such a proceeding would entail extra cost and labor, but the loss in one direction would be more than compensated in another. Small institutions, no more than large, can afford to overlook this matter of providing against the danger from fires.

Prompt and effective action is essential when fire is first discovered. A pail of water applied the instant a blaze is discovered may be more effective than 1000 barrels 10 minutes after the flames have gained headway. It is an excellent practice to have the workmen thoroughly drilled, and to have them frequently called out on false alarms, so that they may have the requisite experience in case of actual need. Some works have a thorough fire organization. A regular system of discipline is established. The men are formed into companies or squads. They have special duties assigned to them in case of fire, and they are trained to work promptly and efficiently, and without the excitement which is observed in almost every instance where a body of unorganized men undertake the same duty. The trouble of organizing the men is not so great as one would suppose. Drilling an hour or so once a week would soon bring the men into excellent training. If the works are large and more than one company is formed, it would be an excellent idea to promote a generous spirit of rivalry between the different companies, in order that the greatest degree of excellence in training might be promoted. What is worth doing at all is worth doing well, and the better the organization the greater is the security against the ravages of fire. This is a matter which should challenge the serious consideration of every manufacturer.

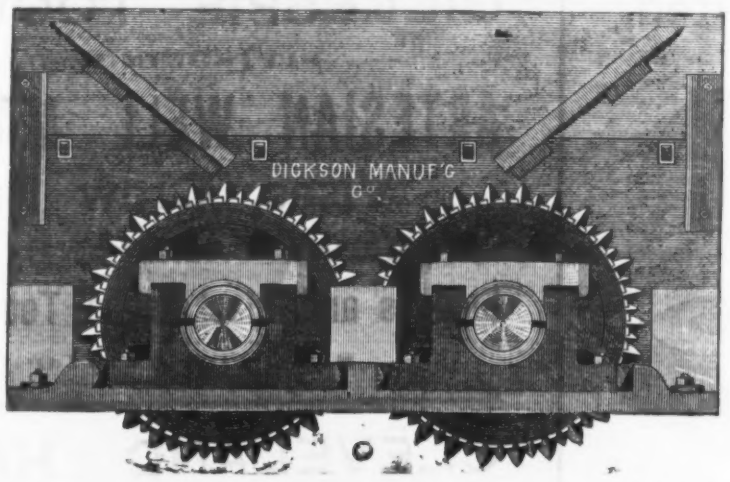
Rules of Trade.

Attention, says the *Pottery and Glass Journal*, has of late been called to a subject which in one shape and another is constantly getting near the surface, covering, first, a lack of business ethics involved in the loose habit which certain unscrupulous purchasers have in countermanding orders without adequate reason, and, secondly, the practice of dating bills ahead. The first difficulty is one which ought and will naturally correct itself. A purchaser whose order is fickle and unreliable in due course of time will find himself spotted and repudiated in turn by all staunch houses that tolerate only legitimate business transactions. He is only playing with a rope that will eventually hang him. There may be apparent momentary gain, but he will finally stand out in the trade marked and known for simply what he is. Beyond this there can be no invariable rule which will harmonize all the hitches and unpleasantness of business transactions. Rivalry is strong, competition ever on the alert. Some one must and will sell goods. It is usually the wakeful and energetic house, and he who rightly takes in the situation will generally give to his trade in the main the stamp and character it ought to have. The cold, austere, legally just rule is impracticable. The graceful concessions of formal rights in the matters of strict business is no uncommon occurrence. There are numberless considerations constantly springing up which vary the standpoint and the look. Unscrupulous countermanding of orders is to be deplored. It works necessary hardships when done, but the remedy, outside of here and there a particular case, lies so completely within the domain of business tact and discretion that a wise house will generally surmount all the real difficulties.

As regards dating bills ahead, the practice, when the real object is purely to postpone payment, is unquestionably dangerous. With the seller it is an assumption of a shaky risk, and to the buyer it only gives a little longer time to beat the devil round the bush. It is conceivable that a house which has a close, shrewd cash customer might wink at a plausible statement that the goods sought to be sold are not wanted at once, and if shipped now the bill might be dated accordingly. It knows that the bill when sent will be promptly discounted. Here the element of risk—the inability of the buyer—is not involved. But when the practice simply postpones pay-day, which will have no clearer sky six months hence than now, one of two things is very apt to happen—either the buyer is going to be loaded up with more goods than he can carry, or he is laying in stock with at best but meager prospects of paying for it. It is, indeed, plausibly said that the exigencies of trade require, toward a large number of buyers, a particular leniency. Not all have the requisite capital to carry on business. They must therefore be carried to a large extent by the houses with whom they deal. However wisely this may be done in many cases, it requires, after all, such a careful generalship, such a watchful overlook, that few large concerns have for it the requisite time. When trade, however, has fallen into this rut, no one house can ignore it and keep its customers. The remedy lies in concert of action. If the hazard involved is sufficiently pronounced to justify attention at all, it becomes a matter of natural interest, and the practical step is to unite in repudiating the custom.

Improvement in Rolls for Coal Breakers.

Up to within very recently the cast-iron rollers used in coal breakers had the teeth in them inserted in parallel rows into drilled holes or rings. When the teeth became loose or blunt, or broke, the cylinder had to



The Broadbent Tool for Extracting Coal Breaker Teeth.—Fig. 1.—Side View of Improved Coal Breaker Roll.

be taken out of the breaker to allow of the teeth being sharpened or removed. This involved such an amount of annoyance, loss of time and expense, that operators not infrequently permitted defective rolls to grind good coal into culm dirt for weeks rather than incur the great outlay involved in a renewal of the teeth. When the teeth were finally removed, it was done by driving them through into the cylinder, whereby the hole was enlarged and the regular-sized tooth, when replaced, soon worked loose. "The Broadbent Improved Rolls," recently introduced into the anthracite region, have effected a considerable change in this respect. In the latest patterns of breaker rolls the teeth are no longer of uniform size nor in parallel rolls, but vary in size and in position, the smaller teeth being in intermediary rows and between the larger teeth, thus securing the breaking of the coal to the desired size. The holes are drilled, reamed and drifted with a hardened steel drift, and made of strictly uniform size, the drifting after reaming giving the hole which receives the tooth a hard and glazed surface, which admits of extracting and redriving the teeth but the stub is drilled and tapped, a false tooth screwed in, and the stub drawn out with the extractor.

The saving to the operator with this kind of rolls, as compared with the old style, is very great, and makes the difference in their first cost of but little moment. The standard bore of the main breaker-rolls is 8 inches, and the shafts are of hammered iron. The driving or long shaft is coupled with flange coupling 18 inches in diameter, secured by six 1¼-inch turned fitted bolts. This is done to facilitate turning the rolls to any point without disturbing the belt when the teeth are to be sharpened. The diameter of fly-wheel pulley and length of driving-shaft are made to meet the requirements of the driving power, as the speed of breaker-tooth at point should be 1000 feet per minute for breaking coal, and for phosphate rock 750 feet per minute. The pillow-blocks or journal-boxes (five in number) are furnished with caps and seats; these seats are filled with Babbitt metal for 6½ x 12 inch journals. The bases of pillow-blocks are planed to a standard hight from center, and rest on cast beds, which are planed top and bottom. These are provided with adjusting keys, so that the rolls may be set to the finest point. The spur gears for driving rolls are 3-inch pitch, 8-inch face, 6 5-16th-inch bore, and the hopper, which is of cast iron, is in eight pieces, firmly bolted together and secured to bracket-beds. The holding-down bolts are 1½-inch diameter, and of length to suit the timbers for which they are used.

Both the improvement in form of breaker teeth and the extractor are the invention of Mr. Sidney Broadbent, of the Dickson Mfg. Co., of Scranton, Pa. During the short time which this improvement has been before the public we are informed that there have been over 250,000 of these teeth used in different collieries.

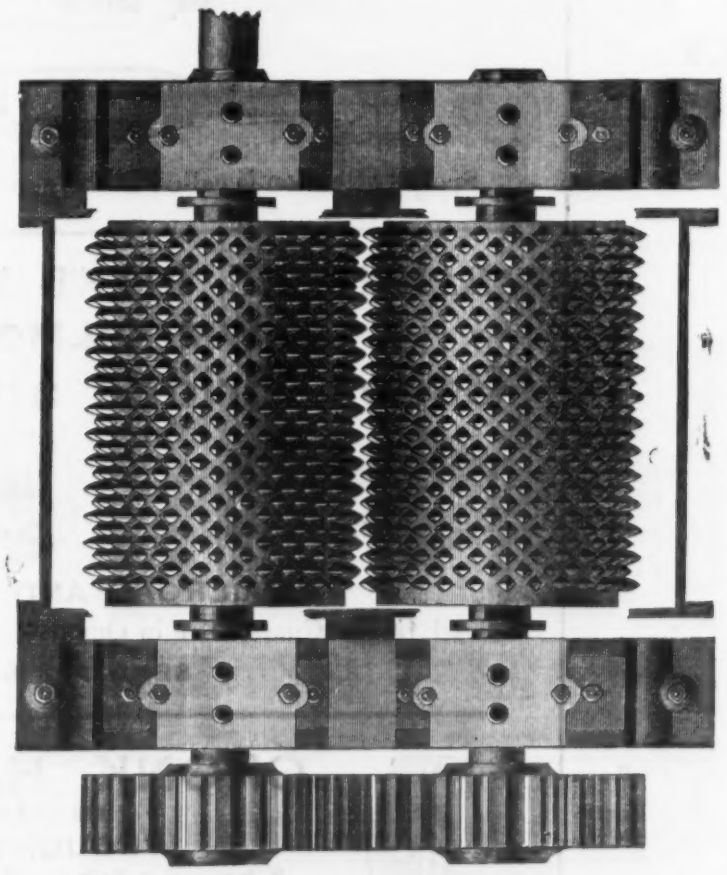


Fig. 2.—Top View of Improved Coal Breaker Roll.

without any appreciable enlargement of the hole. The teeth for these rolls are made of steel, have a cylindrical shank, and just below the tapering upper part of the tooth is a shoulder or neck for the extracting instrument to get a firm grasp of the same. The extracting device consists of a couple of hinged jaws, so shaped on the interior as to fit the shoulder or neck of the teeth, and tapering on the outside to receive a sliding ring which holds them firmly upon the tooth. The hinge is connected with the frame of a hydraulic jack, by means of which the teeth are either extracted or new ones driven into the cylinder. This style of roller practically does away with dull breaker teeth, as it involves only a few hours' labor to extract such teeth as are found dull, to resharpen and to reset them, without removing the roller or anything else connected with the machinery, the operation requiring no more skill than is possessed by any ordinary blacksmith. Should a tooth be found broken off, it is not driven through into the cylinder,

Ocean Speeds.

When the little steamship Savannah steered boldly out into the Atlantic in May, 1819, her speed was not so much thought of as the question whether she would ever get over at all. She made the passage from Savannah to Liverpool in 22 days, and returned in 25 days in November of the same year. This round voyage solved the experiment of ocean steam navigation, and from that time until to-day there have been regular cycles, or periods, in the increase of the speed of steamers, as well as in the particulars of size, comfort and luxury. It was not, however, until early in the fifties that particular attention was given to the increase of speed. Travelers who had been accustomed to the time of our fast American sailing packets viewed a 15 to 18 days' trip by steamer as an excellent one. But this was changed when the hot rivalry between the Collins and Cunard steamship lines began, and the Collins Line went to cutting down time at a rate which attracted world-wide attention; 13-day, and then 12-day, passages began to be common. The American Line put on the superb steamship Adriatic as the last of a fleet of flyers, and the Cunarders followed suit with the Persia and others, and between them the time was reduced to inside of 11 days for regular passages. These were all side-wheel steamers, and, burning an enormous amount of coal, were unable to carry much freight, so special attention was given to the care of cabin passengers, emigrants still sticking to the sailing vessels. The loss of the Arctic and Pacific, and other misfortunes, in a few years drove the popular Collins Line out of existence, but not before the Adriatic had shaded a 10-day passage considerably. English steamship lines from that time out had it all their own way until other nations began going to the Clyde to build ships with which to start lines of their own. By 1861 the old paddle-wheel steamers had generally given place to screw propellers, the fleet of which has since then been gradually enlarged to its present proportions.

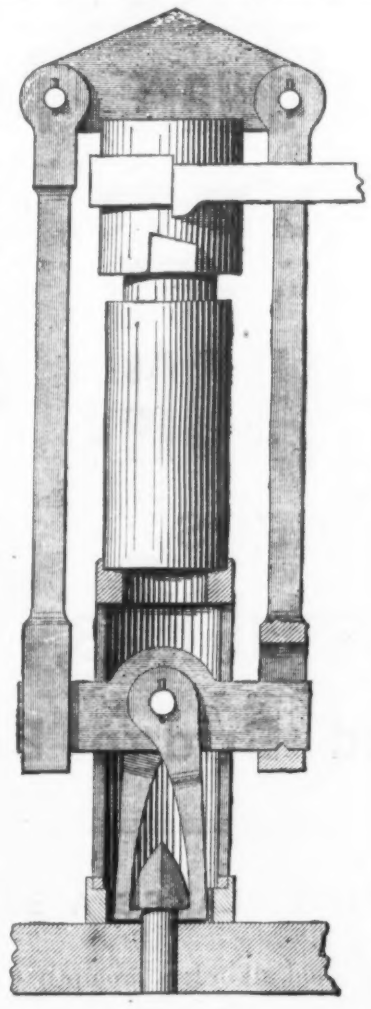


Fig. 3.—Side Elevation of Jack, with Gripping Device of the Broadbent Extractor.

All this time English shipbuilders have not been idle, but very progressive and eager to seize on any improvement that would increase the speed of steamers. American inventors have not been idle either, and, in fact, the most important improvements and inventions in iron steamers have been made by Americans, though we have not an American-built steamer in the Atlantic trade. For many years 10 days continued to be a good average fast passage, but new lines starting to compete in passenger and freight traffic began to rival and surpass the older lines by regularly cutting down the 10-day trips, until by 1875 8-day trips began to be common. The White Star Line was conspicuous for several years in this respect, though now, as a longer route is taken, the passages are not so quick. In 1876 the White Star steamer Britannic made six outward trips, averaging 7 days 18 hours 26 minutes, the homeward passages averaging 7 days 20 hours 56 minutes. The fastest trips of the vessels of this line are as follows: Germanic, 7:11:37; Britannic, 7:10:53; both made outward in 1877. In 1879 the Celtic made an outward passage in 8:4:25, and the Baltic in 8:0:6. The Republic made an outward passage in 1881 in 8:1:20. The fastest average of 54 outward voyages made by the Britannic since 1876 is 8:7:17, the average homeward time being 8:3:22. About the same time the Inman Line steamers were making some quick trips. The City of Richmond made an outward trip in 1875 in 8:0:12; the Berlin, in 1877, in 7:14:12; the Chester, in 1878, in 8:3:40; and the Brussels, in the same year, in 8:1:39. The Berlin made seven passages outward in 1875, averaging 8:10:56. The averages of the Richmond for several years were also under 9 days. The fastest passage ever made by any steamer of the National Line was made outward by the Spain in 1872 in 8 days and 13 hours. The Egypt has also made several trips under 9 days. The line does not claim, however, to make any better than regular steady 9-day trips to Liverpool at present. The Cunard Line, French Line, North German Lloyds Line and others also had vessels which made some exceptionally quick trips between 1875 and 1880, but this period may be set down as the 9-day period, though, as shown above, the the average of the voyages of several crack ships during that time was considerably under 9 days.

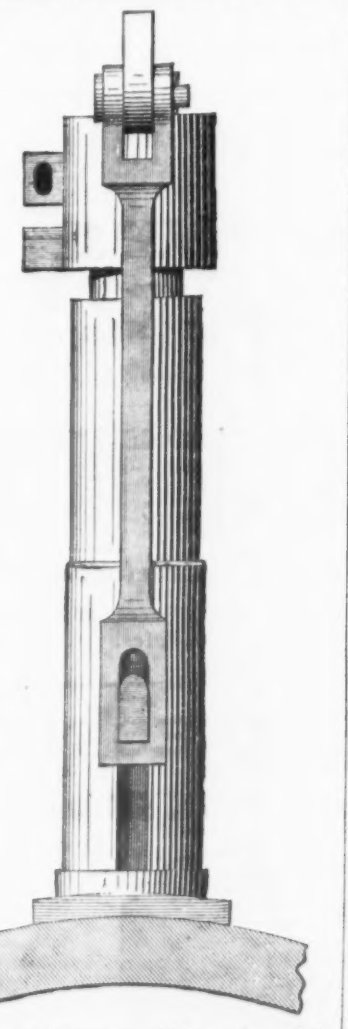


Fig. 4.—End Elevation of Lever, &c., of the Broadbent Extractor.

The Arizona, of the Williams & Guion Line, astonished everybody by cutting under the fastest time on record in September, 1881, when she made the voyage this way in 7 days 8 hours 32 minutes. The next month she eclipsed this performance, making the run homeward in 7 days 7 hours 48 minutes, the fastest trip she has yet succeeded in making. A year later, however, the Alaska, of the same line, surpassed even this remarkable feat, making the homeward voyage in 6 days 18 hours 37 minutes, and this stands to-day as the fastest on record. A recent trip was almost as quick. She sailed April 29 and arrived here May 6, making the voyage in 6 days 23 hours 46 minutes. The best daily run of the Alaska was 447 knots, made in November, 1882. But the new steamer Oregon, of the same line, which will be here in August, is expected to outstrip in speed even the Greyhound of the Atlantic, as the Alaska is called. She is being built on the Clyde, by John Elder & Son, who also built the Arizona and the Alaska. The Oregon will be 520 feet long, 54 feet beam and have engines of 13,000 indicated horse-power—2000 more than the Alaska. She will have 72 furnaces and 9 boilers, engines of the usual type, three inverted cylinders, one high-pressure 70 inches and two low-pressure 104 inches diameter, and will be of about 9000 tons gross tonnage. Of course, other lines have had to follow suit in the direction of speed, and several are striving after 6-day boats. The new steamer Normandie, of the French Line, arrived here May 13 on her first trip, having made the run from Havre, 3200 miles, in 8 days 16 hours. The Alaska led her by about a mile and a quarter an hour in average speed, but the Normandie is expected to do much better when the newness is worn off the machinery. It must be remembered, in making comparisons, that the French steamers have a course about 360 miles longer than the Liverpool steamers. The Elbe, of the Bremen Line, made the trip of 3173 miles from the Needles recently in 8 days 7 hours 45 minutes. The City of Rome, of the Anchor Line, has received additional boilers and more powerful engines, and on her recent speed trials is reported to have made 63 revolutions and attained a speed of 18½ knots. If so she can beat the Alaska, but the speed trials were probably made in smooth water.

Thomson & Co., of Glasgow, are building a new 6500-ton steamer for the National Line. She is to be 430 feet long, 51 feet beam, and built entirely of steel. She will be named the America, and it is predicted she will turn out a 6-day boat. The Egypt, Spain and Italy of this line have all good models, but their engines are not powerful enough. It is contemplated to take them one at a time and put in additional boilers and more powerful engines to increase their speed. The Cunard Line has at present a flyer in the Servia, built of steel at Glasgow in 1881. She beat the Arizona's time not long ago on the eastward trip, making it in 7 days and 5 hours, but has never beaten the Arizona going westward. The Inman Line has a 6000-ton ship, called the City of Chicago, nearly completed, which will be here about the middle of summer. It is thought that before another year passes one or more of these new crack ships will inaugurate the 6-day period. The 5-day epoch is regarded as being yet rather remote, but steamship men consider it by no means improbable that, with the continual improvement in mechanical science, a 5-day passage will be made ere many years. Of course, increase of speed means increase in size, in consumption of coal, and consequent increase of expense. The Oregon will burn nearly 300 tons of coal a day. The old iron steamer of 2500 to 3000 tons is changed to a steel one of 6000 to 9000 tons. The coastwise steamers we now have are larger than the old Transatlantic side-wheelers. Very fast American-built steamers, mostly iron, are now engaged in trade between Northern ports, and the improvements in them are equal to those in the steamships engaged in the foreign trade. On both sides of the Atlantic busy brains are at work constantly devising new inventions and appliances to increase speed as well as safety, comfort and luxury, and any improvement soon becomes general under the pressure of the great rivalry in ocean passenger and freight traffic. For this reason there is little radical difference to be seen among the first-class ocean steamships of the present day.

Death of an Old Iron Manufacturer.—A report from Reading, Pa., dated May 22, announces that on the morning of that day, Joseph Bailey, the oldest iron manufacturer in Berks County, Pa., died at his residence at Pine Iron Works, in his 88th year. He was born in Upper Dublin Township, County of Philadelphia, February 17, 1796. He removed in 1819 to Marlborough Township, Chester County, where he engaged in

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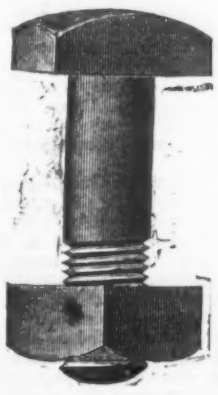
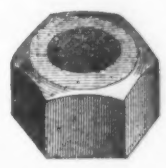


BAR IRON,



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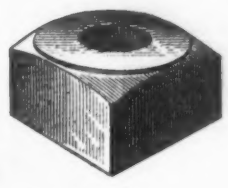

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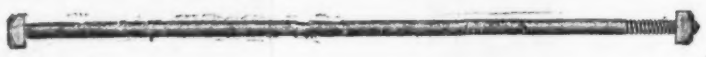

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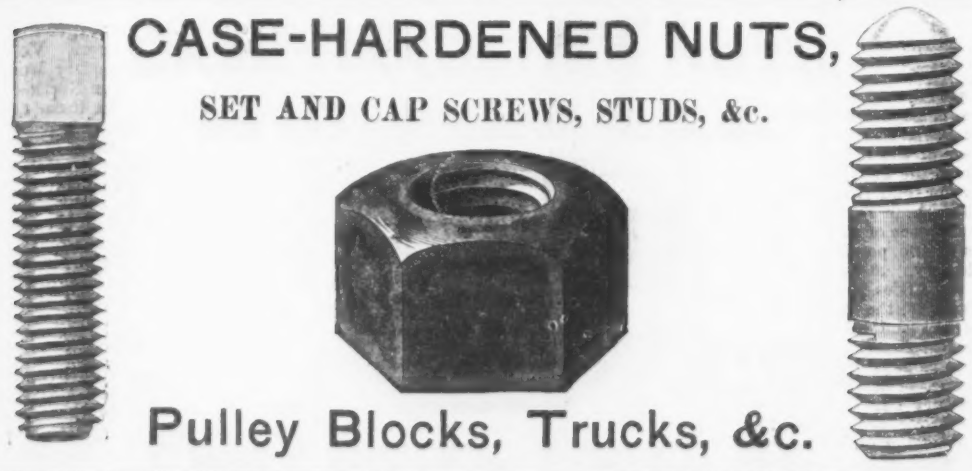

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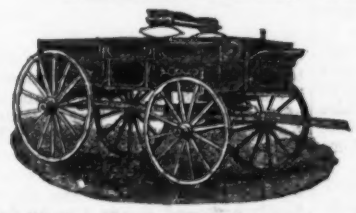
WAGON  **HARDWARE.**

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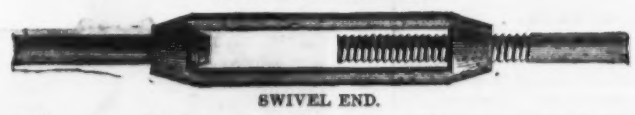

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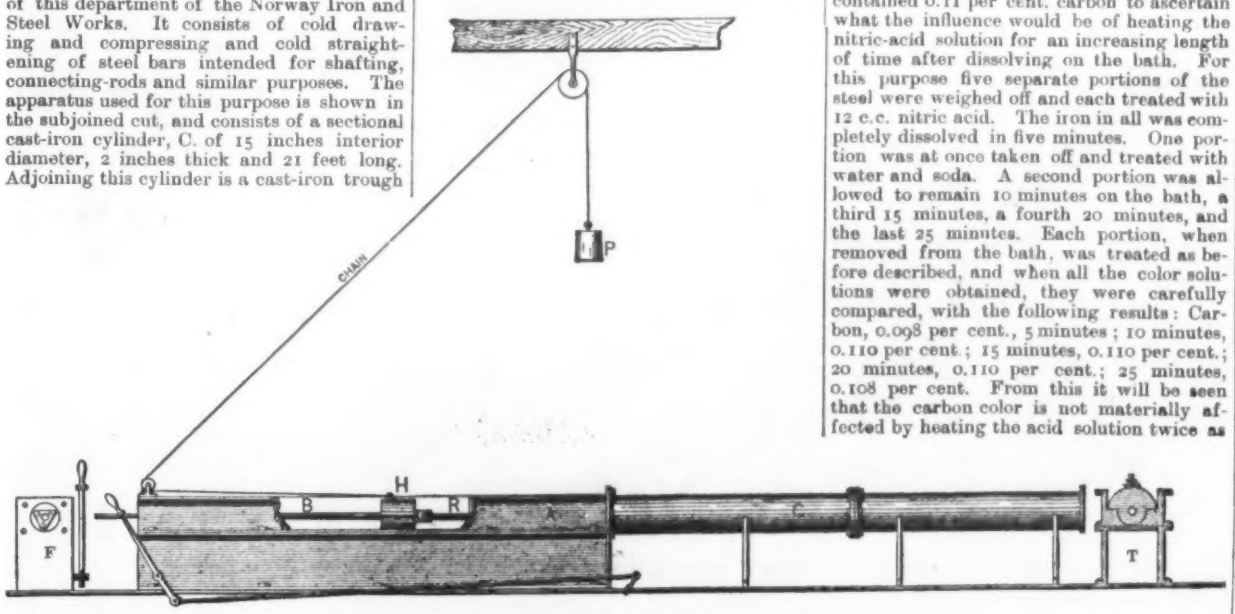
farming until 1838, when he removed to Coatesville and commenced the manufacture of iron. In 1844 he purchased of the assignees of John Rutter the old Pine Forge property in Berks County. He removed there, and the following year tore down the old forge and erected a rolling mill, which is still operated.

Compressed Steel Shafting.

Messrs. Naylor & Co. have for some time past been manufacturing at their works (the Norway Steel and Iron Works), at Boston, Mass., compressed steel shafting and patent finished machinery steel which is attracting a great deal of attention. The process is carried on under the patents of Mr. Geo. H. Billings, who is also in charge of this department of the Norway Iron and Steel Works. It consists of cold drawing and compressing and cold straightening of steel bars intended for shafting, connecting-rods and similar purposes. The apparatus used for this purpose is shown in the subjoined cut, and consists of a sectional cast-iron cylinder, C. of 15 inches interior diameter, 2 inches thick and 21 feet long. Adjoining this cylinder is a cast-iron trough



Compressed Steel Shafting, Built by Naylor & Co., Boston, Mass.

frame, A, shown in section at T, of equal length with the cylinder. To the end of this trough is bolted the frame F, shown in end view, into which are set the steel dies through which the rods are drawn. The piston-rod R is of steel, 3 inches in diameter, and its outer end is screwed into an ordinary testing-machine head, H, which receives the serrated wedges, of sizes corresponding to the sizes of the rods to be drawn. This head slides upon projections or ledges in the trough, which serve as guides to keep the bars to be drawn in a true line, and also prevent all tendency to rotation. The bars to be drawn may be of either regular or irregular section, ranging from ¾ inch to 3 inches in diameter. They are swaged down at one end before drawing just sufficiently to allow the serrated wedges to take a good grip of the bar, the power of the grip increasing with and being proportional to the pull.

The sizes to which the rods are drawn advance within the range given, by 1-1000th inch. The power used is hydraulic pressure provided by a powerful pump. The water is admitted into the cylinder by the motion of the hand-lever, shown at the end of the trough, which is under the control of the operator. When the rod to be drawn has passed through the die the lever is reversed, and the counterweight P draws the piston back, thus returning the draw-head to the die end of the trough.

As will be seen, both apparatus and process are exceedingly simple—yet the results obtained are most remarkable, as is demonstrated by recent tests made at the Watertown Arsenal, with compressed steel bars furnished by Messrs. Naylor & Co. These tests comprise, first, tests of the original hot-rolled steel bar. Next, tests of the cold-drawn bar reduced in one pass about 0.1 inch in diameter, and lastly, test of cold-drawn bar reduced in one pass about 0.2 inch in diameter. From this last bar were also made two compression tests. The following table gives the results of these tests in detail:

TABLE I.—TENSILE TESTS MADE AT WATERTOWN ARSENAL UPON STEEL BARS MANUFACTURED BY MESSRS. NAYLOR & CO.

Description of Test Piece.	Elastic Limit.	Ultimate Strength.	Elongation.	Contraction of Area.	Remarks.
	In lbs. per sq. in.		Per cent.		
Original hot-rolled steel bars; total length of test piece, 66.15 in.; diameter, 2.03 inches; gauged length, 30 in.	26,540	55,400	23.9	42.9	Fracture oblique; silky; slightly granular in center.
Cold-drawn compressed bar from above bar; total length of test piece, 59.30 in.; reduction in one pass, 0.004 in.; leaving diameter 1.936 in.; gauged length, 30 in.	61,100	70,420	2.7	33.5	As above.
Cold-drawn compressed bar from original bar; total length of test piece, 61.04 in.; reduction in one pass, 0.222; leaving diameter 1.808 in.; gauged length, 20 in.	.....	81,890	.75	.....	Fracture more granular; elastic limit not well defined and probably very nearly coincident with ultimate.

The following are tests made some time ago at the Stevens Institute for the purpose of establishing a comparison between common-iron shafting, cold-rolled-iron shafting and compressed-steel shafting:

TABLE II.—COMPARATIVE TESTS, MADE AT STEVENS INSTITUTE OF TECHNOLOGY, OF COMMON-IRON SHAFTING, COLD-ROLLED-IRON SHAFTING AND COMPRESSED-STEEL SHAFTING.

Specimen.	Stresses in torsion. Foot-pounds. At Elastic limit. in.	Actual resilience. Foot-pounds. At Elastic limit. w.
Common-iron shafting, average of three tests	94.40	.76
Cold-rolled-iron shafting, average of three tests	153.60	2.61
Compressed-steel shafting, average of three tests	240.60	5.93

Standard test piece: 1" long, 0.625" diam.

As will be seen from these tests, the actual resilience of compressed-steel shafting is more than six times that of the common-iron shafting, and more than three times that of cold-rolled-iron shafting. The most striking feature in the tests made at Watertown Arsenal with these bars is the rapid raising of the elastic limit, which becomes the more marked with the greater reduction per single pass. That this is naturally accompanied by a diminution of the stretch is fully shown by the increase in the modulus of elasticity from 29,000,000 in the hot-rolled bar, to 31,000,000 in the next, and 33,000,000 in the last bar.

METALLURGICAL NOTES.

Purification of Ores by Air Blast.

According to *Les Comptes Rendus* there are large quantities of ocherous earth in the neighborhood of Genolhac, containing some threads of galena. In no instance, however, does the proportion of lead exceed 7 per cent. The ore is consequently very poor, but it is so abundant that attempts have been made to enrich it by the ordinary processes of washing. These attempts having failed, it occurred to the engineers to try air, which was forced through three superposed metallic cloths, with meshes of four, five and ten millimeters (.157, .197, .394 inches), respectively. The air, being thus perfectly divided, reaches a rectangular box, at the extremity of which a hopper distributes regularly the dried and pulverized materials which it is desired to classify. The worthless portions, being the lightest, are easily driven off by the blast, while the leaden particles, being heaviest, are carried to the bottom.

A New Method for the Estimation of Minute Quantities of Carbon, and a New Form of Chromometer.

In a paper bearing the above title, and read at the recent meeting of the British Iron and Steel Institute, Mr. J. E. Stead, of Middlesborough, submitted the following:

As is well known, it is impossible to determine with accuracy minute quantities of carbon by the ordinary color method, owing to the color of the nitrate of iron present, which interferes so as to make it impossible to judge of the color due to carbon. Having been engaged in some careful investigations on the nature of the coloring matter which is produced by the action of dilute nitric acid upon white iron and steel, it was found that it had the property of being soluble in potash and soda solutions, and that the alkaline solution had about two and a half times the depth of color possessed by the acid solution. This being so, it was clear that the color matter might readily be separated from the iron and be obtained in an alkaline solution by simply adding an excess of sodium hydrate to the nitric-acid solution of iron, and that the color solution thus obtained might be used as a means of determining the amount of carbon present. Upon trial, this was found to be the case, and that as small a quantity as 0.03 per cent. carbon could be readily determined. The method as now in use is conducted as follows: Standard solution of nitric acid, 1.20 sp. gr. Standard solution of sodium hydrate, 1.27 sp. gr. One gram of the steel or iron to be tested is weighed off and placed in a 200 c. c. beaker, and after covering with a watch glass, 11 c.c. of standard nitric acid are added. The beaker and contents are then placed on a warm plate, heated to about 90° to 100° C., and there allowed to remain until dissolved, which does not usually take more than ten minutes. At the same time a standard iron containing a known quantity of carbon is treated in exactly the same way, and when both are dissolved, 30 c.c. of hot water is added to each and 13 c.c. soda solution. The contents are now to be well shaken, and then poured into a glass measuring jar and diluted until they occupy a bulk of 60 c.c. After again well mixing and allowing to stand for 10 minutes in a warm place, they are filtered through dry filters, and the filtrates, only a portion of which are used, are compared. This may be done by pouring the two liquids into two separate measuring tubes in such quantity or proportion that upon looking down the tubes the colors appear to be equal. Thus, if 50 mm. of the standard solution is poured into one tube, and if the steel to be tested contains, say, half as much as the standard, there will be 100 mm. of its color solution required to give the same tint. The carbon is therefore inversely proportional to the bulk, compared with the standard, and, in the above assumed case, if the steel contained 0.05 per cent. carbon, the following simple equation would give the carbon in the sample tested:

$$\frac{0.05 \times 50}{100} = 0.025 \text{ per cent.}$$

Experiments were made upon steel which contained 0.11 per cent. carbon to ascertain what the influence would be of heating the nitric-acid solution for an increasing length of time after dissolving on the bath. For this purpose five separate portions of the steel were weighed off and each treated with 12 c.c. nitric acid. The iron in all was completely dissolved in five minutes. One portion was at once taken off and treated with water and soda. A second portion was allowed to remain 10 minutes on the bath, a third 15 minutes, a fourth 20 minutes, and the last 25 minutes. Each portion, when removed from the bath, was treated as before described, and when all the color solutions were obtained, they were carefully compared, with the following results: Carbon, 0.098 per cent., 5 minutes; 10 minutes, 0.110 per cent.; 15 minutes, 0.110 per cent.; 20 minutes, 0.110 per cent.; 25 minutes, 0.108 per cent. From this it will be seen that the carbon color is not materially affected by heating the acid solution twice as long as is necessary for completely dissolving the carbon compound, and that, although the iron is dissolved in five minutes, it is evident that some of the carbon compound at first formed escapes solution in that period. The next point was to ascertain what effect the use of an excess of nitric acid in dissolving the steel would have on the color matter. To determine this, five separate portions were treated respectively with 12, 15, 18, 21 and 25 c.c. of nitric acid, and heated for 10 minutes on the bath, after which they were all treated with water and an excess of soda solution, and, after filtering, the clear filtrates were compared, with the following results: 12 c.c., carbon, 0.41 per cent.; 15 c.c., 0.41 per cent.; 18 c.c., 0.41 per cent.; 21 c.c., 0.402 per cent.; 25 c.c., 0.380 per cent. From which it is seen that 6 c.c. acid in excess does not materially affect the determination, but when this is exceeded, the color is reduced in quantity. It now became important to know if a greater or less quantity of soda solution would have a different solvent power on the coloring matter. To ascertain this, four separate portions of the soft steel were treated alike in dissolving, but to the solutions different quantities of soda solution were added. The following results were obtained, viz.: 13 c.c., carbon, 0.110 per cent.; 15 c.c., 0.110 per cent.; 18 c.c., 0.110 per cent.; 21 c.c., 0.115 per cent.

Here it will be seen that, as before stated, 13 c.c. sodium hydrate solution is capable of effecting solution of the coloring matter. By using a less amount, however, by experiment it was found that the color is precipitated with the iron oxide. It is very well known that in the old acid-color method very slight traces of hydrochloric acid, if present, alter the character of the color to such an extent as to make the color determination unreliable. It was therefore of interest to ascertain if the same color would occur in the alkaline method. Four portions of steel were treated as usual, excepting that to one portion a single drop of hydrochloric acid was added when being dissolved, to a second five drops, and to a third ten drops, but to the last portion no hydrochloric acid was added. The following are the results obtained, viz.: 1 drop, carbon, 0.105 per cent.; 5 drops, 0.090 per cent.; 10 drops, 0.078 per cent.; none, 0.110 per cent. *Second Test.*—1 drop, carbon, 0.356 per cent.; 5 drops, 0.338 per cent.; 10 drops, 0.324 per cent.; none, 0.410 per cent.

The color in each case, and even in that in which the larger quantity of hydrochloric acid was added, was the same in quality, although differing in quantity, showing (1) that the presence of chlorides is harmless, and (2) that nitro-hydrochloric acid, even in small quantities, prevents the formation of the full amount of color matter capable of being produced by nitric acid alone. A large number of samples of low carbon iron have been examined by the alkaline method, including samples of iron taken from the Bessemer converter at the end of the blow before any addition of spiegeleisen. The results are likely to be of interest to many members present, and I therefore give them here:

BLOWN IRON—TAKEN FROM THE BESSEMER CONVERTER.

	Per cent. carbon
No. 1	0.040
No. 2	0.036
No. 3	0.045
No. 4	0.039
No. 5	0.061
No. 6	0.04
Average	0.045
Average by combustion	0.048

	New Color method. pr. ct. carbon.	Combustion. per cent.
Standard soft steel	0.120	0.122
Pure iron wire	0.038	....
Cleveland iron ship plates	0.055	....
" " " "	0.035	....

The color solutions from these low-carbon irons are different in tint from those obtained from the higher carbon steels, and it is important that a low-carbon iron be used as a standard for comparison. When high-carbon steel is heated to redness and chilled, it is well known that the color from the chilled steel is very much less in quantity than that from the same steel before hardening. The difference, however, is not nearly so marked when there is little carbon present in the steel, as was proved by the following results, viz.: Several samples of iron and steel after being drilled were heated to redness and chilled in water, the results before and after being as follows:

	Per cent.	Difference. Per cent.
Soft steel = soft	0.168	
" chilled in cold water	0.158	0.010
" chilled in hot water	0.168	
Staffordshire square iron bar	0.110	
Staffordshire square iron bar, chilled	0.100	0.010
Staffordshire flat iron bar	0.069	
" " chilled	0.069	None.
Soft steel	0.077	
" chilled	0.071	0.006

It is not often that soft iron or steel is chilled before being placed in the hands of the analyst, but it is satisfactory to know that, even if they were, the results by color would not be rendered useless. When using the new method, I have found that some steels give a much yellower color than others, and in course of investigation have discovered that there are present in all nitric-acid steel solutions two distinct coloring matters, which I have separated and obtained in a nearly pure state, one of which is bright yellow, resembling potassium chromate, the other being of a dark-brown red color. In some steel solutions the yellow color preponderates, and in others the brown. I expect and hope that the investigations I am working at will eventually throw some light on the true constitution of hard and soft steel, and I trust also that before long I may have the pleasure of bringing their results before you.

Speaking of the new chromometer in question, the author stated that in comparing color solutions there are two methods of procedure. The first is that generally adopted in making determination of the carbon by the acid color process, in which the darker solution is diluted with water until the colors of the two solutions are equal in density—that is to say, until the color is equal per cubic centimeter. In the alkaline method it is better to use the method of comparing directly the relative density of the color solution without dilution, and ascertaining the lengths of the two columns of liquids, which, when examined from the surface, give the same depth of color. The carbon in this process is, as compared with the standard, inversely proportional to the length of the liquid column. If a fixed length of liquid column be used of the solutions of carbon and a variable standard column, then, by using a suitable standard solution, the carbon may be deduced from the length of the latter required to make a color column equal in depth to the former, and the percentage read directly from a graduated scale. The instrument here considered is made on this principle; it is extremely simple and easily constructed. It consists of two parallel tubes, which may be of any suitable diameter, one of which is contracted at a point 9 inches from the top, and is open at both ends. The lower end passes through an india-rubber cork to the bottom of a 4-ounce bottle, which contains the standard color solution. A second tube of smaller diameter also passes through the cork into the bottle, the outside end of which is in communication with a large syringe. Just above the contracted part of the first-mentioned tube a small glazed cylinder of china clay rests. By pressing the syringe the liquid can be forced from the bottle below this tube. The second tube is about 9 inches long, and is closed at the lower end. At this end a small glazed clay cylinder is also placed. When this tube is placed parallel to the first, the length from the open upper ends to the flat surfaces of the clay prisms is equal in each. A small looking-glass at an angle of 45° is fixed above the open ends of the tubes, and the standard tube is graduated into 0.01 parts to 0.15 parts. The method of working with the apparatus is very simple. The color solution to be compared is placed in the second tube, with which it is filled up to a certain fixed mark. It is only now necessary to squeeze the syringe and force the liquid up the first tube until the colors in the two columns are equal, as can be seen by looking into the mirror above. The hight of the standard solution is read off on the graduated scale, which will be the percentage of carbon in the steel or iron under examination.

Utilization of Tin-Plate Scraps.

One of the most recently devised processes for the separation of tin from tin-plate scrap is that of Messrs. Reinecke and Poensgen, of Dusseldorf, Germany, who dissolve the tin in a lye consisting of hydrate of soda or potash dissolved in water, to which massicot has been added to excess. A series of revolving drums are used, through which the metal is made to pass consecutively and automatically, thus economizing labor and insuring a more perfect removal of the two. The lye is placed in a series of vats or receptacles, in each of which is a cylindrical drum revolving on a horizontal axis and immersed to about half its diameter. The vats are heated so as to maintain the lye at about boiling point, either by external fire heat or steam-jackets or by internal steam-pipes. The drums have large central openings in their sides; they are supported on their shafts by internal radial arms situated at one side thereof, so as to leave the other side quite free. The arms have inclined branches at their ends leading toward the free side, which is connected thereto by bolts passing through slotted holes, so that the side can be shifted around somewhat. A series of bars placed close together in a radial direction are passed loosely through holes in the adjustable side and in the opposite arms, which bars constitute grate-like scoops or blades, by which the scrap metal in the drum is raised up as the drum revolves. In addition to these bars, plates are provided, which may be inserted behind the bars when it is desired to accelerate the delivery of the scrap metal from the drum, such delivery being also regulated by shifting the movable side of the drum, so as to cause the bars to assume a more or less oblique position. A series of these drums are arranged side by side, and between each two is an inclined shute connected to the fixed framing, and having at its upper end a hinged flap, so arranged in one position to project obliquely into the interior of the drum and catch the scrap metal carried up by the scoops, and convey the same down the shute into the next drum. When turned up on its hinge the flap prevents the delivery of the metal into the shute. As the drum revolves in the lye of the vat a chemical reaction takes place between the lye and the tin on the scrap metal, the latter becoming dissolved by the former, while lead is deposited from the lye in the form of mud in the drum and the vat. As a portion of this mud is also deposited on this scrap metal, it is advisable to place together with the same a quantity of granular metal in the drum, which, as the latter revolves, has a scouring effect on the scrap metal. The mud that is deposited in the vat is automatically removed therefrom by hinged scrapers on the outer surface of the drum. This mud is introduced into a heated retort to be reoxidized in order to be used over again. In operating with this apparatus the scrap metal, being introduced into the first drum, is first cleansed from dirt and other impurities by the heated soda lye in the vat, after which it is conveyed by the shute into a second drum with perforated sides, which is not immersed in a vat, but through which a stream of fresh water is caused to pass continuously, so as to thoroughly wash off all impurities adhering to the metal, which is then conveyed into a third drum, where the before described process of dissolving the tin from the metal is carried out. From this drum the scrap metal may be caused to pass through a fourth, fifth and any other number of drums until the tin is entirely dissolved, after which the scrap metal is again conveyed into one or more washing drums, so as to thoroughly cleanse the same for use in any known manner. The lye in the vats having become sufficiently saturated with tin in solution, it is removed and clarified, and it may then be either treated in the known manner for the production of stannate of soda, or it may be diluted and treated with carbonic acid for the precipitation of the tin as oxide, leaving carbonate of soda, which may be separated from the liquor by centrifugal action and washing, and may then be treated with milk of lime for the production of caustic soda lye, to be used again in the above process.

Malleable Nickel.

Pure nickel, after melting and casting, generally holds a greater or less quantity of oxygen in solution, and the metal is brittle. To hinder the injurious effects of the oxygen it is necessary to incorporate in the melted nickel some substance which has a strong affinity for oxygen and also for the nickel itself. J. Garnier finds that phosphorus serves both of these purposes very satisfactorily, producing effects analogous to those of carbon in iron. If the phosphorus does not exceed $\frac{5}{10}$ of 1 per cent., the nickel is soft and very malleable; above this quantity the hardness increases at the expense of the malleability. Phosphorized nickel, when alloyed with copper, zinc or iron, gives results which are far superior to those that are obtained from the same nickel when not phosphorized. By means of the phosphorus, Garnier has been able to alloy nickel and iron in all proportions, and always to obtain soft and malleable products. The contradictions of illustrious chemists are thus explained, some saying that such alloys were brittle, others that they were malleable; the latter had alloyed the nickel to phosphorized iron.

A Petrified Forest.—Over in Arizona, 240 miles west of this place, says the Albuquerque (N. M.) correspondent of the St. Louis *Globe-Democrat*, and not far from the line of the Atlantic and Pacific Railroad, there is a wonderful petrified forest. Few travelers have yet seen it, but the completion of the railroad will bring tourists in clouds. This freak of nature is accessible from Carrizo Station, a place which appears very large on the map, but is in reality as yet nothing but a section house and water tank. Carrizo lies in the Valley of the Little Colorado. In order to reach the forest one has to hire a horse or a "buck-board" at Holbrook, a station a few miles further west. Returning with the outfit to Carrizo, the traveler strikes off into the country across the Colorado, which at this season is low, and may be easily forded, in spite of its sandy bed. Beyond the river the trail leads over sand and shale, through a level region covered with gramma and buffalo grass and across a deer and antelope range. About 10 miles from the railroad the path enters an immense basin, with gradually sloping semi-circular sides, surmounted by high banks of shale and white fine clay. In this basin is the curious forest. For some distance before reaching it the road is full of small pieces of broken branches, while here and there stumps of various sizes peer above the white sand. A drive of half an hour brings one to the heart of the forest, which, however, it is hardly proper to call "a forest," because the trees are no longer erect, but they are scattered over the surface of the great basin in every conceivable direction. Petrified stumps, limbs and whole trees lie on every side. Immense trunks are broken and scattered about an area of 300 acres. Some of them are five feet in diameter. Numerous blocks appear as fresh as if they had been only recently felled. Many of the smaller chips, especially from the hearts of the trees, have become thoroughly crystallized and sparkle in the sunshine. Those of an amethyst tint are peculiarly beautiful, though every color of the rainbow appears. In nearly every fragment the grain of the wood is plainly visible.

A proposed flour mill in Minneapolis will have a capacity nearly double that of the largest of the great mills now in operation, and to be able to grind 8000 barrels of flour per day. "The magnitude of the proposed mill," says a Minneapolis newspaper, "will appear by considering that the building will have to be as much as 250 feet square and six stories high, besides a storage elevator with room for 500,000 bushels of wheat. It will It will turn out 5½ barrels of flour per minute, 333 barrels per hour, 8000 barrels per day, 2,400,000 per year (300 days). It will require 10,000,000 bushels of wheat per year to supply it, and the value of its annual product will be at least $14,000,000. It will make one third of the present wheat crop of Minnesota into flour, and require an army of men to carry on the work growing out of its operations.

THE IRON AGE BOOK DEPARTMENT.

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Armstrong.—Construction and Management of Steam Boilers. By R. Armstrong, C. E., with an appendix by Robert Mallet, C. E.; 8th edition, illustrated, 184 pages, 12mo, cloth; 1878 . . $0.75

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Baker.—Land and Engineering Surveying. By T. Baker, C. E.; new edition, 231 pages, 12mo, cloth; London (Weale's series), 1879 . . . . . $0.80

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Edwards.—Modern American Marine Engines, Boilers and Screw Propellers. By Emory Edwards, M. E.; 30 large plates, 146 pages, 4to, cloth; 1881 . . . $5

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This work discusses the subject of house drainage and water service in cities, villages and rural neighborhoods in a manner instructive alike to architects, mechanics and house owners. The best forms of plumbing practice are described and illustrated, and the principles upon which good work depends explained. The book is of practical value to the building trades and all interested in the mechanics of hygiene. The contents are as follows: Hygiene in its practical relations to health. Sewer gas. Waste and soil pipes. Traps and seals and the ventilation of soil pipes. Water closets. Service pipes and water service in city houses. Tanks and cisterns. The chemistry of plumbing. Elementary hydraulics applicable to plumbing work. Sanitary construction and drainage of country houses. Water supply in country districts. Suggestions concerning the sanitary care of premises. The plumber and his work.

IRON, STEEL AND METALLURGY.

Bloxam.—Metals; Their Properties and Treatment. By Prof. C. L. Bloxam; 105 illustrations, 312 pages, 12mo, cloth; 1872. . $1.50

With an absence of technicalities, the author distinguishes the properties of the useful metals and their mechanical preparation in such a practical manner that the chemical principles involved may be clearly understood

Bauerman.—Metallurgy of Iron. By H. Bauerman; 5th edition, revised and enlarged, 58 illustrations, 515 pages, 12mo, cloth . . . $2

This work treats of the physical properties of iron ores, and the most approved means of reducing them to the purposes of the manufacturer. The methods of assay and analyses of iron ores are practically considered, as also their composition and distribution. The subject of blast furnaces, their capacity and production, has also received careful attention. In the present edition the author has added to the chapter on Steel Making, and has explained and illustrated the progress recently made in the process of steel manufacture, both of Siemens and Bessemer, especially the latter, by the adoption of lime as a dephosphorizing agent. The book also contains a chapter on the mechanical properties and tests of Malleable Iron and Steel. The author has succeeded in his avowed attempt to supply much practical and reliable information for ironworkers and others, in condensed form.

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The property will be offered for public sale on the premises on the 13th day of June, 1883, at one o'clock p. m. Further information can be obtained from JNO. G. PEEBLES, Trustee,
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OFFICE OF THE COMPTROLLER,
CITY OF ALLEGHENY, PA.,
May 28, 1883.

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Sealed proposals and specifications will be received at this office until 3 p. m. Monday, June 25, 1883, for the construction and erection of three (3) Four Million or two (2) Six Million Pumping Engines, to be located on Water Works property, River Avenue, Eighth Ward, Allegheny, Pa.

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The guaranteed duty must be given on the evaporation of the present boilers now in use at works.

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No proposal will be considered unless in accordance with the above and accompanied by a bond equal in amount to the bid.

All information in regard to the above work will be furnished by Edward Armstrong, Superintendent of Water Works, City Hall, Allegheny, Pa.

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1 12 ft. bed, 30 in. x 30 in., Planer. New York Steam Engine Co.'s make.
1 Engine Lathe, will take 14 ft. between centers, and swing 53 in. over ways, has hollow spindle, and is adapted for both turning and boring, with countershaft. Complete.
1 Engine Lathe, will take in 11 ft., 6 in. between centers, swings 48 in. over shears, and 32 in. over carriage. It has internal gear and cross feed, with countershaft. All complete.
1 Axle Lathe, Fitchburgh Mach. Co. make. Very good.
1 Slotting Machine, 12 in. stroke, slots to the center of 46 in. Adjustable table and universal feed motion.
1 ditto, 12 in. stroke. Very good machine.
1 Combined Power Punch and Shears, to punch ⅝ and ⅛, and shear ⅜ in. iron.
1 12 in Shaping Machine, with traveling head, two tables. Lowell Machine Shop make. Complete.
1 second-hand 3 Spindle Drill, Pratt & Whitney, to drill holes ⅝ to ⅞ in. diam., steel spindles 1 1-16 in. diam. Countershaft complete.
1 Garvin 3 Spindle Drill, drills up to ⅞ in. Table moves up and down by hand or foot. Countershaft. This drill is as good as new.
1 Pratt & Whitney 3 Spindle Drill, with countershaft and hangers complete.
1 Screw Head Slotter. This is an improved machine and in good order.
1 Pond's Double Milling Machine. In excellent order.
2 Face Milling Machines. In very good condition. All complete.
1 No. 1 Brown & Sharpe Screw Machine, in very good condition. Size of hole through spindle 1¼ in. Size of holes in revolving head 1 7 16 in., and mills 6 in. in length. With counter-haft, &c., complete.
2 Single Acting Power Presses, in good condition, being nearly new, No. 3.
90 Small Foot Presses adapted for button making or any kind of light work. Will sell these very low.
1 00 Fowler Press.

Send for Monthly List of New Tools.

The Geo. Place Machinery Company,
No. 121 Chambers and 103 Reade Sts., New York.

LOVEGROVE & CO.,

152 N. Third Street,

PHILADELPHIA,

HAVE FOR SALE A LARGE STOCK OF

NEW AND SECOND-HAND

ENGINES & BOILERS

AND MACHINE TOOLS,

AT VERY LOW PRICES. ALSO,

One 700 lb. Steam Hammer,

FERRIS & MILES,

in first-class order, at very low prices. Write for prices, stating what you want.

HAVING decided to devote ourselves exclusively to

Intricate Die Work

and to the manufacture of superior

Japanned, Pieced and Stamped Tinware,

and other Catalogue Goods, we offer for sale the appliances, and for rent, with power, the rooms now occupied by the following departments of our business:

BRONZE AND BRASS STAMPING,
BRONZE AND BRASS SPINNING,
BRONZE AND BRASS POLISHING,
BRONZE AND BRASS DIPPING AND LACQUERING,
ELECTRO-PLATING (Weston Dynamo-Electric Machine).

To a person of experience, with requisite capital, this is a rare opportunity to engage in a profitable business.

Apply at once, in person or by letter to
THE DETROIT STAMPING CO.,
Lafayette and Brush Streets, Detroit.

Wanted.

Light Machinery of all Kinds to Build.

Also Experimental, Jobbing and Repair Work.

Would also contract for rolling from 100 to 500 tons special shapes or sizes of iron.

Correspondence solicited.

GLOBE NAIL CO.,
Boston, Mass.

For Sale.

The following size Double Refined Bar Iron:

120 Bars, 2¾ x ⅞.
20 " 2¾ x ¾.
187 " 1¾ x ⅞.
131 " 1½ x ⅝.
61 " 1⅜ x ⅝.

SITES & GILL,
222 and 224 S. Third St., Philadelphia, Pa.

Wanted.

A Salesman for our Iron Department in San Francisco. A man thoroughly conversant with the iron business in all its branches, and also of steel, pipe tubes and heavy hardware. Apply by letter to
DUNHAM, CARRIGAN & CO., New York,
Post Office Box 2664,
giving particulars of age, experience and salary expected.

SUPERINTENDENT WANTED.

For Factory near New York. Must understand Machine Shop, Wood Shop, Foundry, Blacksmithing, &c., according to modern customs, and be a man of proven ability.

Address, stating experience, expectations, &c.,
"WOOD & IRON,"
Care of William Young, 21 Park Row, New York.

A GETLEMAN with 13 years' practical experience as Manager of Charcoal Furnaces desires a similar position for either Charcoal or Coke service. Has had considerable experience smelting foreign ores. First-class references furnished.
Address "MANAGER 299,"
Office of *The Iron Age*, 83 Reade St., New York.

ROSE POLYTECHNIC INSTITUTE, Terre Haute, Ind.—A School of Engineering, Mechanics, Civil Engineering, Chemistry and Drawing. Manufacturing machine-shops, laboratories, library, cabinet and models. Address, till Sept. 1, S. S. EARLY, Esq., Sec'y. After that date, CHARLES O. THOMPSON, Pres't.

A GENTLEMAN well up in Iron in all its branches, also Steel, requires position as Traveler for a good house. First-class references.
Address "E. G. B.,"
Office of *The Iron Age*, 220 S. 4th st., Phila., Pa.

Special Notices.

For Sale.

SIX 75-H.-P.

BABCOCK & WILCOX BOILERS,

SECOND-HAND.

Lately in operation at the Havemeyer Sugar Refinery, Greenpoint, N. Y. The above having been taken in part payment for 2000 H.P. of our latest pattern, will be sold cheap. Address

THE BABCOCK & WILCOX CO.,
30 Cortlandt Street, New York.
50 Oliver Street, Boston.
15 White Building, Syracuse, N. Y.
32 North Fifth Street, Philadelphia.
91 Fourth Avenue, Pittsburgh.
45 Chamber of Commerce, Baltimore.
48 South Canal Street, Chicago.
60 Carondelet St., New Orleans, La.
505 Mission Street, San Francisco.
50 San Ignacio, Havana.

Book on "Steam," to any address, free.

THE BABCOCK & WILCOX CO.,
New York. Glasgow.

FIRST-CLASS PAYING BUSINESS For Sale.

Parties having built up and thoroughly established an extensive and fine paying business, will sell the same, including several fine machinery specialties in iron and wood, and a jobbing business of every class of Gearing, Shafting, &c., and Foundry and Woodwork. Specialties have but little competition and are easily managed. The jobbing business includes a very fine collection of patterns in constant use, and controlling a very large jobbing trade. Also Machinery, Tools, Stock, &c., and good will.

Above business is constantly growing, and has every year cleared **a very large amount of money.** Is centrally located and upon a large and never-failing water power, with canal through premises and excellent railroad facilities. The reason for owners offering same is because the business has grown too large for present buildings and facilities and is contantly growing, and they desire to remove one specialty, for which they have lately secured letters patent and requiring special buildings and machinery, to the center of its market in the West, which will relieve sufficiently the present facilities now overcrowded. Or should any parties desire, we will sell the specialty and retain the other business.

The straightforwardness of above facts can be readily ascertained.

Any young man or old business men having money will find either business a very pleasant and profitable one. To save annoyance or trouble, we will answer inquiries only from parties with commercial standing or who are vouched for by bankers or other responsible parties. Would prefer parties with means, interested and looking for an established, paying business, to call personally upon us with proper letters and introductions.

E. W. ROSS & CO.,
Fulton, N. Y.

SPECIAL NOTICE.

IN PRINT AND READY FOR DISTRIBUTION IN 30 DAYS,

A POCKET MANUAL FOR ENGINEERS, EDITED BY

JOHN W. HILL, Mechanical Engineer,
Member American Society of Civil Engineers;
Member American Association R. R. M. M.

EDITION TEN THOUSAND.

Of which, first 2000 copies will be furnished, postage prepaid, at one dollar ($1.00) each; subsequent copies will be furnished (postage prepaid) at one dollar and a half ($1.50) each. A pocket manual of useful information for mechanical engineers, steam users and mechanics, containing 224 pages (set in nonpariel type) of carefully selected data, formulæ and experimental investigations from the latest and most approved sources. Printed from electrotype plates, on white No. 1 book paper, in stiff morocco covers with cardinal edges. Size of page 4½ x 6¾ inches. From press of Robert Clarke & Co., Cincinnati, O.

Published by **WILLIAM A. HARRIS,** Builder of Harris-Corliss Steam Engines, Providence, R. I., to whom all subscriptions for copies should be sent.

GREENFIELD TOOL CO.,

GREENFIELD, MASS.

The plant, stock and supplies of this company, which has been long and favorably known for its manufactures of Planes and Table Cutlery,

WILL BE SOLD

at auction on the 12th day of June, 1883, at two o'clock p. m., on the premises, together with the additional real estate of the company.

Information as to the sale will be furnished on application to

GORHAM D. WILLIAMS, Assignee,
Greenfield,
Mass.

Wanted.

To Sell or Let, a first-class Foundry, situated in the village of Green Island, N. Y., on the opposite side of Hudson River from Troy; within easy reach of Hudson River and Erie and Champlain Canals. Goods can be shipped as late as 6 p. m. and be in New York early next morning. To manufacturers of Hardware specialties it offers exceptionally fine advantages. Has a good engine and all necessary machinery in the buildings.

Correspondence solicited. Address
JAMES MORRISON,
Troy, N. Y.

E. BISSELL & CO.,

Wholesale Hardware Auctioneers,

83 Chambers and 65 Reade Sts., N. Y.

Sales held weekly for the trade. Consignments solicited. We refer to the leading manufacturers and importers.

TO HARDWARE MANUFACTURERS AND JOBBERS.

Wanted to Exchange, by a person well acquainted with the Hardware Trade, 8000 acres No. 1 White Oak Timber Land, situated in Missouri, for a general assortment of Hardware. The Hardware to be at ruling rates to jobbers, as land will be put in at an extremely low valuation, and is a bargain as an investment.

Address W. R. S.,
Office of *The Iron Age*, 83 Reade st., New York.

WANTED.—To make arrangements with one or two good traveling men to sell a new Hog Ringer and Rings on commission, who are already on the road. Good commissions paid.

Address H. C. HART,
Box 55, Unionville, Ct.

Special Notices.

NEW AND SECOND-HAND

MACHINERY.

1 Engine Lathe, 42 in. swing, 20 ft. bed. New.
1 " 42 in. swing, 16 ft. bed. New.
1 each Engine Lathes, 36 in. swing, 20 ft. and 16 ft. bed. New.
1 Engine Lathe, 30 in. swing, 18 ft. bed. 2d hand.
1 each Engine Lathes 26 in. swing, 10 ft., 12 ft., 14 ft., 16 ft., 20 ft., 24 ft. bed. New.
1 Engine Lathe, 24 in. swing, 8 ft. bed. 2d hand.
1 " 23 in. " 16 ft. " "
1 each Engine Lathes, 21 in. swing, 6 ft., 8 ft., 10 ft., 12 ft. bed. New.
1 each Engine Lathes, 20 in. swing, 6 ft., 8 ft., 10 ft., 12 ft. bed. New.
2 Engine Lathes, 20 in. swing, 8 ft. bed. 2d hand.
1 each Engine Lathes, 19 in. swing, 7 ft., 8 ft., 10 ft. bed. New.
4 Engine Lathes, 19 in. swing, 6 ft. bed. Nearly new
1 " 19 " " 7 " " 2d hand,
1 " 18 " " 8 " " New.
1 " 18 " " 7 " " 2d hand.
1 " 18 " " 6 " " "
1 " 18 " " 6 " " New.
1 each Engine Lathes, 17 in. swing, 6 ft., 7 ft., 8 ft., 10 ft. bed. New.
1 Engine Lathe, 17 in. swing, 6 ft. bed. 2d hand.
1 " 16 " " 6 " " "
1 " 15 " " 9 " " "
1 " 15 " " 6 " " "
2 " 15 " " 6 " " New.
1 " 14 " " 6 " " 2d hand.
2 " 14 " " 6 " " New.
1 " 13 " " 6 " " "
3 " 13 " " 5 " " "
1 " 12 " " 5 " " "
1 " 12 " " 4 " " 2d hand.
1 " 11 " " 5 " " New.
1 " 10 " " 4 " " "
2 Hand Lathes, 15 in. x 5 ft. bed. New.
2 " 12 in. x 4 ft. bed. 2d hand.
1 " 12 in. x 4½ ft. bed. New.
1 " 12 in. x 4 ft. bed. New.
1 " 11¾ in. x 4 ft. bed. New.
1 " 10 in. x 3 ft. New.
1 Bench Lathe, 8¾ in. x 3 ft. bed. New.
1 Foot Lathe, 8¾ in. x 3 ft. bed. New.
1 Foot Lathe, 12 in. x 4 ft. bed. New.
1 Foot Lathe, 8 in. x 2 ft. 8 in bed. New.
1 Turret Lathe, 2d hand. 16 in. x 5 ft. bed.
1 Planer to plane 31 in. x 30 in x 6 ft. 2d hand.
1 Planer to plane 34 in. x 32 in. x 12 ft. 2d hand.
1 Planer to plane 27 in. x 27 in. x 7 ft. New.
1 Planer to plane 24 in. x 24 in. x 8 ft. New.
1 Planer to plane 22 in. x 22 in. x 4 ft. New.
1 Planer to plane 20 in. x 20 in. x 4 ft. New.
2 Planers to plane 16 in. x 16 in. x 3 ft. New.
3 Crank Planers. New.
1 Shaping Machine, 12-in. stroke, 33-in. traverse. New.
1 Shaping Machine, 12-in. stroke, 18-in. traverse. New.
2 Shaping Machines, 7-in. stroke. 2d hand.
1 Index Milling Machine. 2d hand.
1 Back-geared Milling Machine. New.
1 Milling Machine, with Arm. New.
1 Hand Milling Machine. New.
1 Automatic Milling Machine. New.
3 24-inch Upright Drills, Bk. Gr. and Self Feed. New.
1 22-inch Upright Drill, Wheel Feed. New.
1 20-inch " " Lever " "
1 Sensitive Drill. New.
1 " " Second-hand.
1 4-Spindle Drill Press. New.
1 3 " " " "
1 2 " " " "
1 Single Spindle Light Drill, Table Feed. New.
1 Single Spindle Profiler. New.
1 Two " " Light. New.
1 Screw Machine. New.
1 " Slotter. "
1 Cutter Grinder. "
1 Slitting or Circular Shear. New.
2 Tapping Machines.
1 Bolt Cutter, ¼ to 2½ in. Nearly new.
1 13 ft. Bending Rolls. 2d hand.
1 40 in. Car Wheel Borer. 2d hand.
3 Power Presses. New.
1 Foot Press. New.
1 Screw Press. New.
1 Drop Press. New.
2 Shafting Straighteners. New.
1 9¼ x 12 in. Stationary Engine. New.
1 5 in. x 6 in. Stationary Engine. New.
1 10 H. P. Upright Boiler. New.

Wood-Working Machinery.

1 Double Saw Bench. New.
1 Variety Turning Lathe. New.
1 24-in. Surface Rotary Bed. New.
1 Band Sawing Machine. New.
1 Scroll " " "
1 Rod Machine. Self Feed. "
1 Sandpapering Machine. 2d hand.
1 8-in. Molder, 4 sides. 2d hand.
1 Edge Molding Machine, 2d hand.
1 Daniels Planer. 2d hand.

And lot of others, both new and 2d hand.

If the list does not contain what you want, write us.

J. M. BADGER & CO.,
49 DEY STREET, New York City.

FOR SALE.

No. 6 Baker Blower, Nos. 4 and 6 Sturtevant Blower, No. 6 McKinzie Blower; Cupola, 48 inches; Crane, 15 tons; 2, 4, 6 and 10 H.-P. Baxter Engines; Planer, 20 x 16 x 4 ft., $250; do., old style, 29 x 29 x 5, $200; Engine Lathe, 30 in. x 14 ft., $350, &c.

Purchases of new and second-hand machinery carefully made, at low rates, for parties out of the city.

C. R. BIGELOW, M. E.,
18 New Church St., New York City.

For Sale.

TREBLE AND DOUBLE-GEARED 25-INCH ENGINE LATHE,

from new patterns.

GEORGE A. OHL & CO.,
East Newark, N. J.

VALUABLE PROPERTY FOR SALE.

The Hardware Works, Tenth and Spruce Streets, Reading, Pa., consisting of Foundry, Machine Shops, Warehouse, and other buildings, machinery, etc., all in first class running order. One entire block of ground. Ample room for extension. Will be sold on easy terms. Apply to

F. C. SMINK,
Reading, Pa.

WANTED.—A permanent position as Manager, Superintendent or Designer and Draftsman by an energetic man who knows his business and scientifically educated, with long, practical experience in originating all kinds of new machinery, both light and heavy, and boilers, estimating their cost and price, and superintending their construction, and the management of help.

Address "F,"
80 East Eighth St., Oswego, N. Y.

Furnace Owners.

An established firm of undoubted standing desire an Agency for sale of Pig Iron for a Pennsylvania or Southern Furnace. They are well known in the trade, and have been doing an extensive business, which they can control for a good company.

Address "NEUTRAL,"
Office of *The Iron Age*, 220 S. 4th St., Phila., Pa.

WANTED.

Hardware Salesmen, with established trades, to introduce a valuable line of goods. HINE & CO.,
2 and 2½ Bowery, New York.

AN ENERGETIC man, with business experience, good address, and practical knowledge of iron manufacture, would like to connect himself with reliable party in iron brokerage business.

Address "ENERGY,"
Office of *The Iron Age*, 220 S. 4th St., Philadelphia.

Special Notices.

New & Second-Hand Machinery.

FEB. 21, 1883.

1 Engine Lathe, 14 in. x 5, 6, 7 and 8 ft Grant & Bogert.
1 " " 26 in. x 12 ft., Grant & Bogert. New.
1 " " 45 in. x 15 ft. Good order.
1 " " 36 in. x 12, 17 ft. New.
1 " " 42 in. x 14 ft. New.
1 " " 14 in. x 6 ft. Star Tool Co. New.
1 " " 14 in. x 6 ft. New.
1 " " 14 in. x 6 ft. New.
1 " " 16 in. x 7 ft. Bridgeport. New.
1 " " 13 in. x 5 ft. and 6 ft. Ames. New.
1 " " 16 in. x 6, 7 and 8 ft. Ames. New.
1 " " 18 in. x8 and 10 ft. Lodge & Barker. New
1 " " 27 in. x 10 in. Lodge & Barker.
1 " " 23 in. x 12 ft. New.
1 " " 20 in. x 10 ft. New.
1 " " 28 in. x 16 ft. New.
1 " " 24 in. x 12, 14 and 16 ft. New.
1 " " 11 in. x 4 ft. and 5 ft. Prentiss. New
1 " " 12 in. x 5 ft. Young. New.
1 Plain Engine Lathe, 16 in. x 4 ft. New.
1 " " " 15 in. x 4 ft. New.
1 Fox Lathe, 15 in. x 5 ft., Am. Tool & Machine Co.
1 15 in. x 4 ft. Turret Lathe. Lodge & Barker.
1 Fox Turret Lathe, 16 in. x 6 ft. Lodge & Barker. New
1 Planer, 50 in. x 50 in. x 17 ft. Good order.
1 " 32 in. x 32 in. x 7 ft. Good order.
1 " 16 in. x 16 in. x 3 ft. New.
1 " 22 in. x 20 in. x 5 ft. New.
1 " 24 in. x 24 in. x 6 ft. Hendey. New
1 " 26 in. x 26 in. x 7 ft. New.
1 " 16 in. Lever Table Drill. New.
1 Crank Planer, 16 in. x 16 in. x 13 in. New.
1 16-in. Upright Drill. New.
1 20-in. " Prentiss. New.
1 24-in. " Prentiss. New.
1 30 in. " Prentiss. New.
1 25-in. swing B. G. & S. F. Drill. Blaisdell. New
1 28-in. " " "
1 38 in. swing, B. G. & T. F. Drill. New.
1 15-in. Shaper. Gould & Eberhardt. New.
1 10-in. Shaper. Gould & Eberhardt. New.
1 15-in. Shaper. Hendey. New.
1 24 in. Shaper. Hendey. New.
1 24-in. Shaper. Hendey. Good order.
1 9-in. Shaper. Hewes & Phillips. New.
1 9-in. Shaper. New.
1 14-in. Shaper.

Full Assortment of Milling Machines, Spindle Drills, &c., of Garvin's. New. J. & Lamson.
1 each Nos. 2 and 4 Screw Machines, Wire Feed. Jones
2 No. 2 Lincoln Millers. Good order.
2 No. 2 Lincoln Millers. New.
1 Hand Lathe, 12 x 4, 5 and 6 ft. New.
1 Hand Lathe, 16 in. x 6 and 7 ft. New.
1 Boring and Turning Mill, 50 in. New.
1 Boring and Turning Mill, 72 in., 2 Heads. New.
1 each 3 and 7 spindle Nut Tappers. New.
1 Gig Saw. Good as new. Rogers.
1 700-lb. Steam Hammer. Ferris & Miles. Good order

New York Agency of
THE TANITE CO. and GRANT & BOGERT MACHIN TOOL WORKS,

H. PRENTISS & CO., 42 Dey St., N.Y

For Sale.

Established 1873. Gardner Bros. "Standard Savage" Fire Brick Works, situated at Ellerslie Station, Md., on Baltimore and Ohio R. R. Also on Bedford Branch of P. R. R. Has convenient shipping arrangements on both roads. Works consist of two independent plants of machinery, so constructed and arranged that they can be run separately or together. One of the buildings entirely new, erected last year. Capacity of works, over 14,000 brick per day. Mount Savage clay in abundance, mined on royalty, and delivered direct into works by gravity. Inclined plane and tram road, large portion of which was laid with new Tee rail last year. New artesian well, capacity over 35 barrels per hour. Also mountain stream, delivering water by gravity into tanks at works. Seven acres of land, with nine good tenements. Everything in first-class order for manufacturing and shipping brick direct from kilns into cars. Good and growing trade established. Brick unquestionably as good as the best made of Mount Savage clay. Statements of business done will be shown to responsible parties desirous of purchasing. Our good will and influence to go with sale. Any further information desired will be cheerfully given by

GARDNER BROS.,
Lockport, Pa.

For Sale.

Established in 1864. Gardner Bros.' Gas Retort and Fire Brick Works, situated at Lockport Station, on P. R. R., 60 miles from Pittsburgh, Pa. The works consist of complete plant for manufacturing Clay Gas Retorts, Settings, Blocks, Tile and Fire Brick. Capacity, about 100 retorts, with necessary settings, and 100,000 fire brick per month. Clay and coal mined by ourselves within short distance of works and hauled in wagons. Over three acres of land, with all necessary buildings, a number of tenements and town lots. P. R. R. has side track alongside our kilns. Good trade established. Our good will and influence to go with sale. Statement of business done will be shown to responsible parties desirous of purchasing. Any further information desired will be cheerfully given by

GARDNER BROS.,
Lockport, Pa.

FOR SALE.

One Cast Iron Vacuum Pan. Vacuum and water pumps and all attachments.
One Granulator, with attachments.
One large Mixer, with attachments.
One No. 5 Vacuum Pump.
Two Sugar Packers.
Two Agitating Engines.
Two Steam Engines.
Nine Char. Filters.
Two Scum Presses.

The above is a portion of the Machinery formerly used at Baltimore Steam Sugar Refinery, Baltimore, Md. For information apply to GEO. B. GRAHAM, P. O. Box 193, Baltimore, Md., or to F. E. ADAM, n. e. cor. Lombard and Concord sts., Baltimore.

For Sale.

The Industrial Works of Shamokin, owned and successfully carried on for a number of years by the late Wm. Brown, deceased, consisting of Foundry and Machine Shop, and a large stock of Patterns regarded as part of the property. Boiler Shop, Blacksmith Shop and Factory for the manufacture of heavy coal screens. Well located in the borough of Shamokin, Pa., with the best facilities for shipping by rail, and surrounded by a district contributing all the work that a shop of that kind can possibly turn out. Easy terms of payment are offered to suit a purchaser of limited capital. For list of Tools and further particulars apply to

WM. McILVAIN & SONS.
Manufacturers of Boiler Plate and Tank Iron,
Reading, Pa.

For Sale.

Heavy Planer, 39 in. x 39 in. x 13 ft., with rack extension, to plane 20 ft. Good as new.
24 in. to 36 in. planers.
15 in. column drills.
12 in. to 36 in. lathes.
Lever Shears to cut 2 x 2.
Lever Shears to trim ⅛ plate.

A. G. BROOKS & WINEBRENER,
261 N. 3d St., Philadelphia.

For Sale.

Stock of General Hardware, Stoves and Tinware, and good-will of the business without bonus. Stock will inventory thirteen to fifteen thousand. Business located in a growing town of about 9000 inhabitants, in Northwestern Pennsylvania, and a railroad center. For further information, address

"G. T."
Office of *The Iron Age*, 83 Reade St., New York.

A Gentleman

well known to the Hardware and Woodenware Jobbing trade of the Northern States, from Boston to Omaha, now representing one factory, desires to add two or three others, selling the goods direct, and on a small salary, he paying expenses. Has had years of experience with this trade.

Address TRAVELER X. Z.,
Office of *The Iron Age*, 83 Reade st., New York.

WANTED.

A situation as Inspector of Iron, by a man who has had several years experience in the manufacturing of iron. Reference given.

Address BOX 305,
Pottstown P. O., Pa

Trade Report.

BRITISH IRON AND METAL MARKETS.

[*Special Cable Dispatch to The Iron Age.*]

LONDON, WEDNESDAY, June 6, 1883.

Scotch Pig.—The market is weaker, and prices continue to decline. As compared with last week, quotations show a fall of 1/6 on Coltness, 1/6 on Langloan, 1/6 on Gartsherrie, 6d on Summerlee, 6d on Glengarnock, 6d on Eglinton, 6d on Dalmellington and 1/ on Shotts. The following are to-day's prices for makers' brands.

Coltness,	alongside,	Glasgow	61/
Langloan,	"	"	61/6
Gartsherrie,	"	"	57/6
Summerlee,	"	"	59/6
Carnbroe,	"	"	54/6
Glengarnock,	"	Ardrossan	54/
Eglinton,	"	"	48/
Dalmellington,	"	"	49/
Shotts,	"	at Leith	61/

Lighterage from Ardrossan to Glasgow is 1/ ₹ ton.

Cleveland Pig.—The market is irregular. We quote as follows, f.o.b. shipping ports:

Middlesboro'	No. 1 Foundry	43/6
"	No. 2 "	42/6
"	No. 3 "	39/ @ 40/
"	No. 4 Forge	38/6

Bessemer Pig—There is no change, the market continuing irregular. We quote W. C. Hematites 50/ @ 51/ for mixed lots Nos. 1, 2 and 3, equal parts, f.o.b. shipping ports.

Blooms—Nominal.

Manufactured Iron.—The market continues irregular. We quote at works, nominally:

		£	s.	d.	£	s.	d.
Staff. Ord.	Marked Bars	7	10	0 @	.....		
"	Medium "	6	10	0 @	7	0	0
"	Common "	6	0	0 @	6	10	0
Hoops, 20 W. G. and over.							
"	Common Best	7	5	0 @	7	15	0
"	Medium	6	10	0 @	6	15	0
"	Common	6	5	0 @	6	10	0
Sheets, 20 W. G. and under.							
"	Ordinary Best	9	10	0 @	10	10	0
"	Common	7	10	0 @	8	0	0
Welsh Bars		5	10	0 @	5	12	6

Steel Rails.—The market is a little weaker. We are reported a sale of 10,000 tons for American account at £4. 2/6, to be delivered during this year at New Orleans. We quote Ordinary Sections, £4. 12/6 @ £4. 17/6, f.o.b shipping ports.

Iron Rails—Dull and nominal. Welsh, 30 ℔ and upward, are quoted, nominally, £4. 15/ @ £5. 10/, f.o.b. shipping ports.

Old Rails.—The market is irregular. We quote Old D. H.'s, c.i.f. New York, £3. 12/6 @ £3. 15/.

Scrap.—The market is steadier. We quote Heavy Wrought £3. 2/6 @ £3. 5/, c.i.f. New York; Bessemer Crop Ends are quoted 60/ @ 62/, f.o.b. shipping ports, for run of the mill.

Copper—Is steadier. Best Selected is quoted £69. 10/ @ £70, and Chili Bars, £64 @ £64. 10/.

Tin.—The market is irregular. We quote Straits Ingot, spot, £94. 15 @ £95. 5/, and futures, £95. 15 @ £96. 5/.

Tin Plates.—The market is steadier. We quote:

Tin Plates, 10 x 14,	1st qual.	Charcoal		19/6 @	20/6
"	2d "	"		18/6 @	19/
"	1st "	Coke		17/6 @	18/
"	2d "	"		16/ @	16/6

Spelter—Is without change to note. Ordinary is quoted £14. 15/ @ £15 at shipping ports.

Lead—Is lower. We quote Common English Pig £12. 15/ @ £13. 5/.

Freights.—Steam from Glasgow to New York, 7/6; Liverpool to New York, 6/ @ 8/; Liverpool to Philadelphia, 7/6 @ 8/, and London to New York, 7/6 @ 9/6.

FINANCIAL.

Office of THE IRON AGE,
WEDNESDAY EVENING, June 6, 1883.

In business circles the aspect of commercial affairs is considered more satisfactory than one week ago. With the advent of June the Stock Exchange exhibited a decided improvement, more marked than for many a day. This was mainly due to the settlement of troubles in the iron trade, the threatened lockout having been averted. Good news concerning the crops and the amicable settlement of difficulties in the Iowa railway pool strengthened the more cheerful feeling. Nevertheless, the movement was largely speculative, based upon a short interest which it became necessary to cover, sometimes at a heavy loss. Outside of the speculative markets, the inactivity complained of for some time past was not perceptibly relieved, although it is admitted that in most departments the volume of business is fair for the season. The weekly bank statement showed a slight loss of surplus, but the position of our financial institutions is considered better than it was one year ago, giving promise of ease through the summer months. A better demand for money in some of the Western markets tends to check the flow of currency toward this center, and like influences may be expected to operate until the renewal of activity in the fall. On the 1st inst. the Treasury disbursements on account of interest on the 4½ per cent. bonds, amounting to nearly $3,000,000, together with considerable sums paid out in dividends by financial corporations, contributed to the prevailing ease, but the aggregate will be far surpassed when the regular semi-annual payments take place on the 1st prox. Business failures in different parts of the country show little change numerically, compared with several weeks past, and are about one-third larger in comparison with the corresponding week in 1882. The Clearing House returns of 26 leading cities afford a more satisfactory indication of the state of business than has been observed before for several weeks. The improvement, compared with the corresponding week in 1882, is most noticeable in the Northwest, while Eastern cities mostly show a decline. Breadstuffs are weak, in the absence of export demand; cotton tends to lower values, and rates for Transatlantic freight are nominal.

On the Stock Exchange during the week under review the market has manifestly improved, and closes buoyantly. On Thursday there was a better tone, which developed on Friday into a sharp advance. Union Pacific was strong after the declaration of the quarterly dividend and the announcement that $1,500,000 bonds had been satisfactorily placed, and the settlement of labor troubles at Pittsburgh aided in moving almost the entire list upward. New Jersey Central received a special impulse from the reported removal of all legal obstacles to the Reading lease. Gowen and Gould were both credited with assisting in a bull movement, in the interest of their special favorites. On Saturday there was renewed confidence, and the coal shares were conspicuous in the advance, as well as the grangers, supposed to be due to "a vigorous covering of shorts." On Monday St. Paul was unfavorably influenced by the announcement of the intended issue of new stock, and the other properties were affected by realizing sales. On Tuesday there was, on the whole, an improved tendency, but prices were irregular, with the coal shares a principal feature. To-day there was an unexpected buoyancy, due to special causes of a financial nature, to which were added flattering crop reports and increased railroad earnings in the Southwestern system. The advance on the general list was ½ @ 1¼, the latter Reading. The later dealings were in St. Paul at 104¼, 104⅞, 104½, 104¾; Lackawanna at 126¼, 126¾, 126½; Central Pacific at 76½, 77⅜, 77, 77¼; Union Pacific at 97, 97⅜, 97⅜, 97¾, 97⅜; Jersey Central at 85⅞, 86½, 86¼; Louisville and Nashville at 50, 50¾, 50½; Michigan Central at 96⅛, 96¾, 96½; Oregon and Transcontinental at 84¾, 85⅛, 84⅞; Denver at 46¼, 47¼, 46⅞, 47⅛.

Government bonds were generally firm and higher, closing as follows:

	Bid.	Asked.
U. S. 5's, 1881, continued at 3½	103¼	—
U. S. 4½'s, 1891, registered	112¾	113
U. S. 4½'s, 1891, coupon	112¾	113
U. S. 4's, 1907, registered	118¼	118⅞
U. S. 4's, 1907, coupon	119¼	119⅞
U. S. 3 per cents	103⅜	103⅝
U. S. Currency 6's, 1895	127	—
U. S. Currency 6's, 1896	128	—
U. S. Currency 6's, 1897	129	—
U. S. Currency 6's, 1898	130	—
U. S. Currency 6's, 1899	131	—

State bonds were dull; Louisiana consols sold at 66; Tennessee 6s, Mixed, at 40, and do., Compromise, at 45. Foreign exchange is firm, with few bills offering. Posted rates are $4.86 for 60-day, and $4.89½ for sight. Loanable funds are in good supply. We quote 60 to 90 days' indorsed bills receivable, 4 @ 5 %; four months' acceptances, 5 @ 5½.

The weekly statement of city banks shows a slight decrease in the surplus reserve. The Treasury payments which began on Thursday are not reflected in the statement. The banks still hold $9,072,592 above the legal limit.

The following is an analysis of the bank totals of this week, compared with that of last week:

	May 26.	June 2	Comparisons.	
Loans	$316,281,500	$317,576,800	Inc.	$1,294,300
Specie	£2,826,800	£2,251,500	Dec.	575,300
Legal tenders	23,758,300	24,552,500	Inc.	794,200
Total reserve	86,585,100	86,804,000	Inc.	218,900
Deposits	209,630,800	310,929,400	Inc.	1,298,600
Reserve required	77,007,700	77,732,350	Inc.	324,650
Reserve	9,177,400	9,071,050	Dec.	105,750
Circulation	15,994,400	16,021,300	Inc.	26,900

According to the Custom House reports, the importations of specie and bullion at this port during the week ending June 1 were $24,006, consisting of $5278 in gold and $18,728 in silver, as against a total of $18,426 for the week ending June 2 last year. The importations since the 1st of January compare as follows with the movement during the corresponding period last year:

	Since January 1. 1883.	1882.
Gold	$4,749,473	$528,469
Silver	1,963,466	1,199,437
Total	$6,712,939	$1,727,906

The reduction of the national debt in the 11 months ending the 31st ult. amounted to $115,725,000, and the surplus for the entire year will probably not exceed $125,000,000, a sum slightly in excess of Secretary Folger's original estimate, which has been affected by legislation and the varying demands of the Pension Office. The receipts for the present fiscal year have been nearly equal thus far to those of the 1st year, except in the customs division, where the decrease is already about $10,000,000. The coinage of the United States Mint in Philadelphia last month was valued at $1,216,200, of which $1,000,000 was in silver dollars.

MINING STOCKS.

The following were the closing quotations for mining stocks:

	Bid.	Asked.
Amie	16	18
Alta. Mont	3	4
Belle Isle	25	....
Bulwer	58	....
Bassick	7¼	....
Big Pittsburgh	....	20
California	30	37
Climax	7	9
Con. Imp	10	12
Con. Va	....	66

Chrysolite	1.05	1.15
Central Ariz	....	33
Cherokee	3	4
Dahlonega	2	3
Durango	6	8
Dunkin	....	30
Decatur	5	....
Eureka Con	3.00	4.00
Elko Con	18	20
Father de Smet	....	4.50
G. Prize	35	....
Homestake	....	16
Hukill	4	....
Horn Silver	6¼	6⅜
Harlem	....	1.50
Hibernia	3	....
Hortense	9	....
Hall-Ander	....	1.40
Independence	30	....
Iron Silver	2.80	....
Lacrosse	12	13
Leadville, Con.	....	65
L. Pitts	78	....
L. Chief	....	52
Navajo	1.45	....
N. Standard	10	....
N. Belle	6¼	....
Ori. & Mil	....	20
Pipe Lie cer	1.14¼	1.14⅜
Rappahannock	6	....
Robinson Con	....	80
Red Elephant	....	8
Sierra G	1.60	1.70
Silver Cliff	....	19
Sutro Tun	26	27
Sp. alley	20	1.00
Sonora Con	36	39
Union Con	6½	....

GENERAL HARDWARE.

Business is reported good for the season, although it is not at all brisk. The comparison of results thus far this year with those for the corresponding period last year makes a much more favorable showing than was generally expected, and we find several instances in which the amount of sales is larger in money value this year than last, notwithstanding the fact that prices are much lower. Stocks in the hands of the trade have been reduced by the caution which has been exercised in buying during the past half year or more, while manufacturers have not allowed any accumulation on their hands. Prices have been reduced on most goods to what is regarded as a low figure, even considering the present low prices of metals, so that there seems a fair probability of advancing prices as soon as any increase in demand springs up.

The Nail market has been disturbed by the failure of the expected strike in the Western mills, and, as is usually the case in such a time, many unscrupulous persons have countermanded the orders they had placed in expectation of a scarcity and an advancing market. Prices have not seceded, however, and the expectation of the trade is that the demand will be sufficient to maintain them for some time. Stocks here are light and broken, 8d. being particularly scarce. We quote $3 to the trade.

Our 24th page is taken up by Dodman & Burke, 100 Chambers street, New York, in an advertisement of the Continental Lawn Mower, which they are introducing to the trade. It is fully warranted, and the following points of merit are claimed for it: The cutting bar in the rear, the Mower thus adapting itself to any unevenness in the ground; that the gearing is completely covered, rendering clogging impossible; that the ratchet or pawl has no spring, and the Mower is practically silent in its operation; that the material used is of superior quality, so that breakage is not likely to occur; that the cylinder knives are solid cast steel, made by a patented process, are hardened and tempered in oil, self-sharpening, and never require a file or stone after leaving the factory; that all the bearings in the Mower are long, so that the wear on the Mower will be slow, and oil seldom required; that the Mower is made to run at high speed, and will not only cut higher grass, but leaves the lawn perfectly smooth; that the Mowers are so light and easy to work that all sizes 10 to 15 inch can be used by a lady or lad; that they have the adjustable handle, and will cut on terraces and borders, cut close to walks or flower beds, are easy to handle, and do the work perfectly. The following are the list prices, from which a discount of 30 per cent. is allowed the trade:

10 inch	Price, $13
12 "	" 15
14 "	" 17
16 "	" 19
18 "	" 21

FOR HIGH GRASS.

15 inch	Price, $20
17 "	" 22
19 "	" 25

The new catalogue of the McNab & Harlin Mfg. Co. is a handsomely printed volume of 332 pages, 9½ by 12 inches, illustrated by good cuts, many of which are full size. Among the goods of which illustrations and descriptions are given we may mention Boiler Tubes, Iron Pipe and Fittings, Brass and Iron Valves, Cocks, &c., for steam, water and gas; Boiler Makers', Steam and Gas-Fitters' Tools, and Plumbers' Materials. To any one interested in these lines of goods there is no more useful book to be had. It will be found to contain the most recent novelties, as well as the regular staples of the trade. On account of the numerous additions this company have made to their goods, the numbers and figures by which they were designated in former catalogues have been changed. The book does not give price lists.

Morley Bros., of East Saginaw, Mich., have just issued a catalogue and price list of Mill and Lumbermen's supplies. This is a very interesting compilation in one volume of all the articles which come within these classes, and, as such, must fill a want in the section where it is published. It is a well-got-up volume of 212 pages, 9 by 11½ inches, and contains many illustrations.

The attention of the trade is invited to the advertisement on page 44 of Messrs. Macomber, Bigelow & Dowse, Boston, representing the Imperial Club Skates, for which they are the sole agents for the United States, and for which they claim, with other peculiar advantages, that of originality in detail and combination.

We have received a copy of a neatly-illustrated catalogue and price list, issued June 1 by the J. Barton Smith Co., Fourth and Somerset streets, Philadelphia, of their manufacture of Cast Steel Files and Rasps of every description, Wood Saws, Butcher and Kitchen Saws, Saw Rods and Frames. A portion of this catalogue is devoted to the representation and description of the various styles and sizes of their Framed Wood Saws, upward of 20 in number, among which are the leading brands, the "Cut-I-Cure-U" and "Favorite," to which especial attention is called in an accompanying circular addressed "To the trade." A further space in the catalogue is occupied by cuts and explanatory matter of the Billet Webs, Butcher Bow, Patent Kitchen Saws, and Saw Blades of the stamp of this company. Illustrations and price lists of Saw Rods (Clipper Loop), and Saw Frames, together with a descriptive list of all varieties of Files of this manufacture, and a cut and description of a Celluloid Emery Grindstone for "family use," complete the contents of this book, which differs from most catalogues of the kind by the fact that the illustrations are colored lithographs instead of woodcuts.

The Detroit Stamping Co. have decided to discontinue the manufacture of special Bronze and Brass goods, and offer the plant and rooms now occupied by these departments of their business for sale and rent in an advertisement among our "Special Notices." From the increasing demand for their catalogue goods they think their best policy is to drop every branch that interferes with them.

In another "Special Notice" the Hardware works, Tenth and Spruce streets, Reading, Pa., are offered for sale.

The following circular announces the end of an old concern, though one not very generally known to the trade at large:

So. Hingham, Mass., May 21, 1883.

Dear Sir: In consequence of the low prices that prevail, I am unable to make any money in Hatchets, and am compelled to abandon manufacturing them on my own account. It is with regret that I give up the business that I and my family before me have been so many years building up. Our Hatchets have become known all over the world, and there is a great demand for them. I had hoped to get better prices, but as my customers insisted upon lower prices instead of an advance, I could see no encouragement in the future, and my only alternative was to sell out. Having disposed of my Machinery, Tools, Cuts, Stamps, Dies, Brands, Trade-marks and the right to use my name on Hatchets, to the Underhill Edge Tool Co. of Nashua, N. H., I am obliged to cancel all unfilled orders. Yours truly,

Fred. S. Jacobs.

IRON.

American Pig.—The most important event in the Iron trade since our last has been the reduction by the Thomas Iron Co. of their price for Nos. 1 and 2 Foundry to $20 and $19 respectively. It is only proper to say, however, that they are at present only selling at these prices to persons whom they consider their regular customers. They report the sale of 4000 tons at these prices, and state that they are in receipt of a good many inquiries for Iron, many of them for large quantities. While most of the companies are meeting these figures, there are exceptional cases in which the old rates are still demanded. There seems to be a considerable feeling that this price is low enough to reduce the production of Pig Iron to a manageable amount and give the market the steadiness which it so much needs. Production is being very largely lessened by the blowing out of furnaces, and the stocks in the hands of consumers are everywhere reported to be small, which is the necessary consequence of the careful buying which has prevailed since October. On the other hand, the stocks of Iron in producers' hands are very large—much larger, we believe, than is generally supposed. The bulk of transactions at present continues to be of a small retail character, and there is an obvious indisposition to buy speculative lots at any price. We quote Foundry No. 1, $20 @ $22; Foundry No. 2, $18 @ $19.50; Gray Forge, $17.50 @ $19, at tidewater.

Scotch Pig.—The condition of the American Pig Iron market has naturally had a depressing effect upon Scotch Pig. Buyers exercise a little more caution in buying, but prices are unchanged, being based on those at Glasgow, which, with freights, are at present very low. We quote: Eglinton, $21.25 from ship, $22 from yard; Carnbroe, $22 from yard; Glengarnock, $22.50 @ $23 from ship and yard; Dalmellington, $21.50 @ $22 from ship; Summerlee, $24 from ship; Coltness, $24.50 @ $24.75 from ship; Gartsherrie, $25 from yard; Langloan, $24.50 from ship.

Steel Rails.—We hear of no important transactions. Indeed, the mills are full for so far ahead that there would be great difficulty in buying for early delivery. We quote $38 at mill. We hear rumors of a lower figure, but cannot authenticate them.

Old Rails.—There are no important transactions to report. We quote, as before, $22 @ $23 for Ts to arrive and on the spot. The latest transaction of which we have heard was 200 tons at $22.50. We also hear of 200 tons from Housatonic Railroad at $20.50, delivered at Bridgeport.

Bar Iron.—The course adopted by the manufacturers of Bar Iron in Pittsburgh, in accepting the labor scale of the past year as a basis of the current year, was a gigantic surprise to all dealers and consumers in this market, and has greatly demoralized the entire trade. Prices, which had during the previous week assumed a stronger and steadier aspect, are again unsettled, with a decidedly weakening tendency. While no reduction has nominally been made, and among some the opinion prevails that there is no margin for a decline, we hear of concessions being offered and extra inducements held out for orders of size by manufacturers who are slack, which, it is said, is the case with many of the Western mills, they having refused orders for delivery during the summer months previous to the predicted strike that did not occur. In connection with this comes the announcement of a further reduction in Pig Iron, which adds greatly to the already depressed condition of the market. The demand from store continues reasonably fair, orders being made up from miscellaneous brands, and in such quantities as their immediate wants require. Refined Iron is quoted at $2 @ $2.25 from mills, according to quality. From store Refined Iron is quoted at $2.30 @ $2.40 and Common at $2.10 @ $2.20.

Scrap Iron.—There has not been anything done for months worthy of note in this branch of the Iron business, and the present depressed condition of the market in general does not improve the outlook. We hear of small lots being shipped occasionally, but the prices and quantities are very unsatisfactory. We continue to quote Selected Yard at $25 @ $26, ex-store at $24.50, and ex-ship at 23; 300 tons sold ex-ship on private terms.

METALS.

Copper.—Sales for the week have been restricted to 150,000 ℔ Lake Superior at 15⅞¢ @ 16¢, which is the closing quotation; other brands are worth 14⅞¢ @ 15⅛¢. The Lake companies so far keep up their price; meanwhile, there has been a good deal of talk about negotiations going on for the placing of a lot for export at a reduced figure; so far, however, nothing positive has transpired that we hear of. While thus hardly any actual business in Copper is done, the general feeling is one of depression, by virtue of the slackness in, and reduced volume of, trade in the manufacturing districts, causing both manufacturers and dealers to hold back. This being the case, the stock of Lake Copper goes on accumulating. The time cannot, indeed, be distant when the Lake companies, under the weight they carry, will have to arrive at some resolution, and too much delay may only give them a still lower price ultimately than they can get now when the London market has temporarily improved a little. The latter came yesterday, £64. 10/, Chili Bars, and £69. 10/, Best Selected. We are cabled from there this afternoon: "Copper is steadier; Best Selected, £69. 10 @ £70, and Chili Bars, £64 @ £64. 10/." Manufactures may be quoted as under: Bottoms, 24¢; Braziers, 24¢; Sheathing, 22¢, and Bolt Copper, 24¢. These rates, we presume, may still be shaded.

Tin.—A dull and easier feeling has prevailed since we reported a week ago, London declining to £94. 10/ with Straits Tin, while we are wired from there to-day to the following effect: "Market irregular; Straits ingot, spot, £94. 15/ @ £95. 5/, and futures, £95 15/ @ £96. 5/" We quote Straits to-day, according to size of lots, 21⅜¢ @ 21½¢, and Lamb and Flag, 22¢ @ 22¼¢. On the 1st inst. Messrs. William I. Russell & Co., 12 Cliff street, New York, made the visible supply on this coast 2977 tons, against 3313 tons a year ago. The price on May 31 was, according to these gentlemen, 21½¢, against 21¾¢ in 1882; 19⅜¢ in 1881; 16¢ in 1880. and 14½¢ in 1879. *Tin Plates.*—The market is quiet, but prices are steady. It is supposed that stocks of some kinds may run low this month. There is, meanwhile, an inclination to postpone importation as far as possible, say till the beginning of next month. We quote at the close, large lines, ordinary brands, ℔ box: Charcoal Bright, $5.87½ @ $6.12½; do. Ternes, $5.20 @ $5.35; Coke Tin, $5.12½ @ $5.25, and do. Ternes, $4.87½ @ $5. Liverpool is steady at 15/9 @ 16/ Coke, and 18/6 @ 20/ Charcoal. From London we hear to-day that the market is steadier.

Lead.—This has been an excessively dull week. The Germania people not being able to make up their minds to accept the offer made them for their lot in store, for which they ask 4½¢, it seems, the only two purchases we have been able to ascertain are 125 tons Newark at $4.42½¢, and 100 tons Corroding at $4.45. We may quote both worth $4.45 while finishing this report. St. Louis is inactive at $4.12½ @ $4.15 for both Hard and Corroding; freight this way from East St. Louis, 30¢. From London we receive the following cablegram to-day: "Lead is lower. We quote Common English Pig, £12. 15/ @ £13. 5/." Manufactures are quoted as follows: Lead Pipe, 6¼¢; Sheet Lead, 7½¢; Tin-lined Lead Pipe, 15¢ ℔, and Block-tin Pipe, 45¢, less the usual discount to dealers.

Spelter and Zinc.—The Spelter situation at New York has undergone no change; a dragging little trade is reported, and the market remains featureless, as heretofore, at $4.60 @ $4.70, Common Domestic, with Silesian nominally 5⅛¢; Bertha Refined we quote 7⅛¢ @ 8¢, and Bergenport, 9⅛¢. *Sheet Zinc* is moderately active, but firm, at 6¢ @ 6⅛¢.

Antimony.—The market remains devoid of interest and activity, at $9.70 Hallett, $10.70 Cookson.

OLD METALS, PAPER STOCK, &c.

The purchasing prices offered by dealers are as follows:

Copper, heavy	℔ ℔.	$ .12½ @	.13
" light	"	.10 @	.10½
Copper Bottoms	"	.10 @	.10½
Yellow Metal	"	.7½ @	.8
Brass, heavy	"	.9½ @	.10
Brass, light	"	.07½ @	....
Composition, heavy	"	.12½ @	.13
Lead, heavy	"	.04 @	.....
Tea Lead	"	.03½ @	.....
Zinc	"	.02¾ @	.....
Pewter, No. 1	"	.12 @	.....
Pewter, No. 2	"	.08 @	.....
Wrought Iron	℔ ton.	22.50 @	.....
Light "	"	12.00 @	13.00
Stove Plate	"	11.50 @	12.00
Machinery do	"	14.50 @	15.00
Grate Bars	"	4.50 @	....
Stereotype Plates	℔ ℔.	.04½ @	.05
Electrotype Plates	"	.04½ @	.04½
Small type		.05 @	.05½

The prices current (prices paid by local dealers) for Rags, &c., are as follows:

Canvas, Linen	℔ ℔,	3½c. @	4 c
White Cotton, New	"	3½c. @	.....
" No. 2	"	2½c. @	2¾c.
White, No. 1	"	3¾c. @	4 c.
" No. 2	"	1¾c. @	2 c.
Seconds	"	½c. @	1 c.
Soft Woolens	"	5 c. @	6 c.
Mixed Rags		1¼c. @	1¾c.
Gunny Bagging	"	1½c. @	.....
Jute Butts	"	1¾c. @	.....
Kentucky Bagging	"	.... @	3¾c.
Book Stock	"	1¾c. @	2 c.
Newspapers	"	1 c. @	.....
Waste Paper and Scraps	"	½c. @	....
Kentucky Bale Rope	"	3½c. @	4 c

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port o New York, for the Week endin June 6, 1883.

Hardware.

Alexandre F. & Sons, Mach'y, cs., 2
Baldwin Bros. & Co. Gun barrels, cs., 13
Boker Hermann & Co. Hdw., cutlery, and guns, pkgs., 84
Clark A. G. & Bro. Mach'y, cs., 158; Needles, cs., 2
Cross & Beguelin, Files, cask, 1
Clark Thread Co. Mach'y, pkgs., 322
Delamater C. H. & Co. Mach'y, cs., 4
Dolge A. Mdse., cs., 3
Degrauw, Aymar & Co. Chain, cask, 1; Chain, lengths, 9
Drexel, Morgan & Co. Arms, cs., 21
Duden & Co. Mach'y., cs., 8
Field Alfred & Co. Mdse., cs., 10; Case, 1
Folsom H. & D. Arms, cs., 8
Fredericks Hugo, Chains, cks., 5
Great Western Dis. Co. Cases, 2; Sewing machines, cs., 11
Hartley & Graham, Guns, cs., 3
Havana Gas Light Co. Meters, bxs., 6
Hume Bros. & Co. Mach'y, pkgs., 24
Hammond Robert, Mach'y, cs., 2
Jex W. & Co. Guns, cs., 5
Loewitz Edgar, Case, 1
Lowry E. S. Mach'y, case, 1
Merchants' Dispatch Co. Iron roller, cs., 22; Machines, cs., 5
Markt & Co. Mdse., cs., 43
McCoy & Saunders, Chains and castings, cks., 3; Mach'y., pkgs., 34
Morton, Bliss & Co. Nails, cks., 900; Iron wire nails, kegs, 200
Schwab C. & Co. Mach'y, box, 1
Schoverling, Daly & Gales, Arms, cs., 4; Mdse., cs., 2
Spelman W. B. Cases, 5; Cask, 1
Straus L. & Sons, Casks, 19; Hhds., 83
Vom Cleff & Co. Mdse., cs., 14
Ward Alsine, Mdse., cs., 6; Cases, 3
Wiebusch, Hilger & Co. Hdw., cutlery and guns, pkgs., 25; Casks, 5
Order, Anchors, 2; Chains, 2; Cases, 2; Cutlery, cs., 2; Casks, 7

Iron.

Anglo-Am Roofing Co. Roofing, cs., 154
Bond, Parsons & Co. Black taggers, bxs., 500
Baring Bros. & Co. Wire rods, bdls., 8576; Wire rods, coils., 11,668; Rods, bdls., 657; Coils, 1005
Brown Bros. & Co. Wire, coils, 330
Coddington T. B. & Co. Sheets, bales, 433
Crocker Bros. Pig, tons, 200; Mang. pig, cks., 323
Drexel, Morgan & Co. Pig, tons, 420
Elliott, Sons & Co. Ore, kg., 230,070
Field Alfred & Co. Rails, cks., 8
Iron Clad Mfg. Co. Cases, 322; Sheets, bdls., 91
Lee James & Co. Pig, tons, 100
Morton, Bliss & Co. Rolled beams, 80
Naylor & Co. Pig, tons, 500
Pim, Forwood & Co. Plates, 22
Rieffel J. Ph. Bundles, 111
Swift H. H. & Co. Scrap, tons, 31
Venable & Seyman, Insulated wire, cse., 1
Warren, Jones & Gratz, Cotton ties, bdls., 9900
Williamson Jas. & Co. Pig, tons, 300
Wood, Niebuhr & Co. Rods, pkgs., 351
Wright Peter & Co. Oxide, bbls., 5
Order, Pig, tons, 1392; Rails, 6433; Black taggers, bxs., 165; Wire rods, 549; Old iron, tons, 232; Rods, pkgs., 24,044; Rods, 4164; Scrap, tons, 320; Old rails, tons, 177¾; Coiled rods, bdls., 975; Bars, 65; Rail ends, tons, 312; Old tubes, tons, 20; Broken machinery, tons, 150; Rings, bdls., 16; Spiegel, tons, 336; Bundles, 170

Steel.

Abbott Jere & Co. Wire, bdls., 25
Alexandre F. & Sons, Cases, 20
Baring Bros. & Co. Wire, bdls., 483
Carey & Moen, Rods, bdls., 320; Rods, coils, 345; Bundles, 148; Casks, 19
Cohn M. Casks, 6
Grinnell, Minturn & Co. Railroad springs, box, 1
Hendricks Bros. Bundles, 38
Ladenberg, Thalmann & Co. Wire, bdls., 620
Merchant Dispach Co. Cases, 4
Pim, Forwood & Co. Bar, 1
Plock & Co. Car-wheel tires, 137; Wire, bdls., 549
Rice, Lewis & Co. Bars, 294
Wagner W. F. Bundles, 419; Bars, 23; Cases, 41
Order, Bloom ends, tons. 78; Bands, 343; Bundles, 70; Casks, 19; Cases, 4; Boxes, 2; Rails, 600; Old rails, pcs., 2581; Old railway springs, tons, 100; Bessemer rails, 684; Wire, pkgs., 974; Rings, 10; Rail ends, tons, 95

Metals.

Alexandre F. & Sons, Lead, bdls., 12
Bank of Montreal, Tin and terne plates, bxs., 2609; Tin plates, bxs., 2363
Blake Bros. & Co. Plumbago, bbls., 744
Brown Bros. & Co. Plumbago, bbls., 871
Bond, Parsons & Co. Tin and terne plates, bxs., 1250
Bristol Brass and Clock Co. Packages, 4
Bruce & Cook Tin plates, bxs., 777
Cort N. L. & Co. Tin plates, bxs., 4790
Elwell Jas. W. & Co. Brass, bbls., 6; Lead, bbls., 10; Copper, tcs., 3; Metal, tcs., 2
Foote Emerson, Nickel alloy, cs., 15
Lamarche's Sons H. Rolled zinc, cks., 66
Phelps, Dodge & Co. Tin plates, bxs., 10,091; Black taggers, bxs., 50
Pim, Forwood & Co. Yel. metal, sheets, 2
Sites & Gill, Cop. tubes, bdls., 19; Metal, bxs., 3
Thebaud Bros. Old brass, bbls., 2
Stevenson, Pierson & Co. Yel. metal sheathing, cs., 71
Order, Tin plates, bxs., 5761; Tin and terne plates, bxs., 6308; Plumbago, bbls., 369; Spelter, ingots, 3457; Gun caps, cs., 20; Quicksilver, bottles, 1208; Old zinc sheathing, bdls., 101; Old zinc sheathing, bags., 27; Old zinc sheathing, cks., 8; Spelter, cks., 18; Spelter, plates, 28,770; Old metal, cks., 23; Old zinc, pkgs., 38; Tin, sheets, 65; Old lead, pkgs., 18

EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the week ending June 5, 1883.

	Quan.	Val.
Dutch West Indies.		
Sew. ma., cs.	6	$50
Ptlm., gals.	1000	108
Ag. imp., pkgs	8	53
Nails, kegs	43	165
Dutch East Indies.		
Ptlm., gals.	236,320	25,104
Antwerp.		
Hdw., cs.	49	1,400
Mf. iron, pkgs	5	980
Cop. wire, cs.	27	1,771
Old muskets, cs	131	1,900
Sew. ma., cs.	51	655
Ptl., gls.	1,401,773	109,818
Hamburg.		
Copper, bars.	807	5,527
Hdw., pkgs.	6	197
Cop. mat., pgs	109	3,000
Sew. ma., cs.	819	15,600
Ag. imp., pkgs	12	426
Pumps, pkgs.	2	50
Mach'y, pkgs.	3	204
Clocks, bxs.	52	788
Rivets, case.	1	19
Ptlm., gals.	790,247	66,600
Bremen.		
Ptlm., gals.	981,385	77,498
Ag. imp., pkgs	3	118
Hdw., cs.	33	1,356
Arms, case.	1	84
Clocks, pkgs.	2	145
Mach'y, pkgs.	2	1,000
Mf. iron, pkgs	2	135
Amsterdam.		
Hdw., pkgs.	22	1,149
Mach'y, pkgs.	8	465
Clocks, pkgs.	3	182
Rotterdam.		
Mach'y, pkgs.	2	330
Ag. imp., pkgs	26	72
Ptlm., gals.	282,773	22,300
Hdw., pkge.	1	69
Christiania.		
Ag. imp., pkgs	183	6,400
Lubeck.		
Ptlm., gals.	119,721	9,800
Copenhagen.		
Hdw., cs.	21	470
Clocks, pkgs.	120	1,295
Mach'y, pkgs.	6	656
Borga.		
Ptlm., gals.	298,637	23,888
Mandal.		
Ptlm., gals.	127,125	10,168
Gottenburg.		
Ptlm., gals.	177,781	14,100
Stettin.		
Ptlm., gals.	135,660	10,860
Wasa.		
Ptlm., gals.	74,790	5,500
Nordkoping.		
Ptlm., gals.	81,233	6,496
Helsingfors.		
Ptm., gals.	160,938	12,800
Sodertelje.		
Ptlm., gals	62,374	4,675
Bergen.		
Ptlm., gals	211,835	16,944
Wiborg.		
Ptlm., gals.	124,351	9,944
Aarhuus.		
Ptlm., gals.	135,436	10,836
Liverpool.		
Clocks, pkgs.	294	7,054
Bells, pkge.	1	30
Revolvers, cs.	3	2,150
Mach'y pkgs.	150	8,993
Ag. imp., pkgs.	241	5,235
Nails, bxs.	480	1,300
Ptlm., gals.	324,875	27,785
Shears, cs.	4	850
Sew. ma., cs.	17	553
Hdw., pkgs.	107	3,581
Br. goods, cs.	3	375
Needles, case.	1	294
Nickel plt., cs.	6	500
Nckl. mtl., bbls	28	2,800
Glasgow.		
Sew. ma., cse.	227	2,025
Mach'y, pkgs.	122	5,605
Hdw., pkgs.	40	463
Ag. imp., pkgs	3	475
Cartridgs, cse.	1	60
London.		
Nails, cs.	7	200
Arms, case.	1	105
Sew. ma., cs.	203	7,150
Ag. imp., pkgs	122	3,500
Cartridges, cs	4	160
Hdw., pkgs.	198	9,389
Mf. iron, pkge	1	12
Clocks, pkgs.	219	4,017
Rifles, cs.	50	17,400
Ptl., gls.	2,072,137	169,813
Mach'y, pkgs.	14	1,101
Bristol.		
Mach'y, pkgs.	6	660
Hull.		
Clocks, pkgs.	62	952
Hdw., cs.	48	658
Ag. imp., pkgs	15	1,600
Pumps, pkgs.	3	50
Exmouth.		
Naph., gls.	123,750	8,650
Newfoundland.		
Ptlm., gals.	2000	160
Hdw., pkgs.	11	176
Mf. iron, pkgs	29	271
Clocks, pkgs.	8	120
Pumps, pkge.	1	100
Nova Scotia.		
Hdw., pkgs.	24	294
Tin, pigs	20	501
Ptlm., gals.	4500	555
Sew. ma., cs.	9	400
Mach'y, pkgs.	2	250
British West Indies.		
Hdw., pkgs.	19	325
Ag. imp., pkgs	3	46
Clocks, pkgs.	21	332
Cutlery, pkgs	2	32
Revolvers, cse	1	21
Petlm., gals.	7748	831
Nails, kegs.	17	68
Mf. iron, pkgs	13	158
Cartridges, cse	1	10
Pumps, pkge.	1	12
Sew. ma., cs.	7	77
Scales, cs.	3	46
British East Indies.		
Ptlm., gals.	529,250	53,750
Canada.		
Tin plate, cs.	336	1,598
Lead, pigs.	80	360
New Brunswick.		
Ptlm., gals.	5000	550

	Quan.	Val.
Havre.		
Mach'y, pkgs.	4	$1,180
Copper, pigs.	339	15,200
Ag. imp., pkgs	379	15,531
Copper, casks	36	10,000
Pumps, pkgs.	5	250
Clocks, pkgs.	3	236
Sew. ma., cs.	51	657
Dunkirk.		
Ptlm, gals.	196,248	13,233
St. Loubes.		
Napth. gls.	222,122	13,000
Bordeaux.		
Mf. iron, pkge	1	25
Ag. imp., pkg	1	850
Copper, cks	180	33,750
Sew. ma., cs.	12	220
Iron safe	1	75
W. mills, pkgs	11	100
Engine	1	325
Barcelona.		
Mf. iron, pkgs	49	305
Mach'y, pkge.	1	500
Seville.		
Ptlm., gals.	196,000	18,000
Cuba.		
Mf. iron, pkgs.	353	3,204
Mach'y, pkgs.	42	2,909
Clocks, pkgs.	6	209
Nails, cs.	4	86
Boiler	1	3,975
Ptlm., gals.	274	52
Lead, bxs	5	50
Nails, kegs.	177	563
Cop. tubes, cs	1	83
Tacks, case	1	54
Br. g'ds, case.	1	224
Iron safes	2	206
Cutlery, bxs.	74	1,257
Hdw., pkgs.	61	1,163
Ag. imp., pkgs	18	1,282
Scales, cs.	4	42
Iron, bdls.	30	135
Iron, pkgs.	8	176
Pumps, pkgs.	6	320
Hayti.		
Ptlm., gals.	2948	297
Sew. ma., cs.	12	100
Nails, kegs.	4	12
Scales, cs.	5	78
Hdw., pkgs.	8	1,282
Guns and cartridges	45	6,084
Mach'y, pkgs.	3	2,144
Oporto.		
Clocks, pkgs.	30	495
Brazil.		
Sew ma., cs.	100	1,670
Iron safes	6	538
R. R. wh. and axles, pkgs.	32	245
Mf. iron, pkgs	75	257
Nails, kegs.	140	422
Rifles, cs.	3	246
Clocks, cs.	27	441
Ptlm., gals.	14,266	1,470
Pumps, pkgs.	4	237
Hdw., pkgs.	58	990
Nails, cs.	53	323
Cartridges, cs.	3	50
Scales, cs.	46	208
Cutlery, cs.	10	658
Porto Rico.		
Ptlm., gals.	500	75
Ag. imp., pkgs	6	130
Peru.		
Ptlm, gals.	20,000	2,075
Sew. ma., cs.	50	1,000
Hdw., cs.	30	592
Africa.		
Rifles, case.	1	19
Muskets, cs.	25	725
Nails, kegs.	10	36
Ptlm, gals.	128,750	12,503
Mexico.		
Mf. iron, pkgs	533	3,033
Mach'y, pkgs.	214	7,842
Cartridges, cs	23	657
Ptlm., gals.	11,150	1,269
Cutlery, pkgs.	16	460
Iron safes.	10	705
Arms, cs.	5	300
Clocks, pkgs.	18	637
Spikes, kegs.	75	244
Pumps, pkgs.	4	125
W. g'ds, pkgs.	3	76
Scales, pkgs.	6	145
Tacks, cs.	12	90
Buckles, case.	1	24
Boiler	1	969
Bells	2	14
I. tubes, pkgs	25	214
Hdw., pkgs.	61	1,673
Needles, bxs.	2	545
Nails, kegs.	225	680
Sew. ma., cs.	279	4,195
Windmill	1	36
Revolvers, cs	3	323
Pig. mtls., pgs	8	187
Y. metal, cse,	1	106
Ag. imp., pkgs.	18	674
French West Indies.		
Ptlm., gals.	11,000	1,100
Trieste.		
Ptlm., gals.	358,666	29,100
Corfu.		
Ptlm., gals.	102,600	9,234
Piræus.		
Petlm., gals.	113,700	10,235
Alexandretta.		
Ptlm., gals.	143,000	13,000
Fiume.		
Ptlm., gals.	701,824	52,118
Genoa.		
Sew. ma., cs.	277	2,857
Hdw., pkgs.	15	263
Ag. imp., pkgs	17	118
Japan.		
Ptlm., gals.	470,260	51,700
China.		
Mf. iron, pkgs	100	808
Ptlm., gals.	304,560	31,217
Chili.		
Nails, kegs.	1265	3,996
Mf. iron, pkgs	71	1,229
Mach'y, pkgs.	196	7,000
Ag. imp, pkgs	90	966
Cutlery, cs.	13	132
Pumps, pkge.	1	33
Clocks, case.	1	20
Petlm., gals.	60,000	6,222
Scales, cs.	43	722
Hdw., pkgs.	21	586
Sew. ma., cs.	14	272
Tacks, bxs.	21	119
Venezuela.		
Cutlery, cs.	14	373
Hdw., pkgs.	69	605
Ptlm., gls.	2764	442
Mach'y, pkgs.	477	12,899
Nails, kegs.	34	60
Mf. iron, pkgs	5	97
Per. caps, cse	1	225
Sew. ma., cs.	43	1,486

COAL.

In the Anthracite Coal market prices this week are somewhat firmer, but no activity is expected for at least a month to come. Meanwhile the circular rates are shaded all round, just to make business, and the "cut" is generally understood to be about 15¢ a ton. Next week there will be full time at the mines, followed by two weeks of half time.

Bituminous Coal is in rather better demand, with prices ruling about $4 alongside. Though occasional sales are made as low as $3.73, the nominal rates are $4, f.o.b. In

respect to free imported Coal under the new tariff, of which fears were lately expressed, it is now said that Pennsylvania Bituminous can be put in New York equally cheap, the railway companies giving drawbacks, enabling large operators to hold the trade. Besides, Foreign Coal, in the general run, is not as good for steam purposes as American. All the steamship contracts have been made as usual, but on a lower range of prices.

The *Miners' Journal* says: "About one-third of the furnaces in the Schuylkill and Lehigh valleys and other Eastern points are out of blast, and as the Coal consumed in making Pig Iron is about one-tenth of the entire consumption, the quantity thus diverted from its usual channel would be sufficient to produce a serious disturbance, even if there was a brisk demand for the other sizes. There is not even this offset, however, as the demand for the domestic and manufacturing sizes is unusually sluggish."

The Pittsburgh settlement of the wages question has no effect in the New York market.

FOREIGN TRADE MOVEMENTS.

The following is a summary of foreign trade movements during the past week:

IMPORTS.

For the week ended June 1:

	1881.	1882.	1883.
Total	$4,435,215	$10,148,989	$8,502,838
Prev. reported	177,351,380	209,733,388	185,090,511
Since Jan. 1	$181,806,595	$219,882,377	$193,593,349

Included in the imports were leading articles of merchandise valued as follows:

	Pkges.	Value.
Antimony	167	$9,517
Anvils	120	775
Brass goods	61	7,695
Bronzes	13	1,406
Clocks	21	1,880
Chains and anchors	24	1,235
Copper	...	43
Cutlery	149	41,264
Guns	66	12,742
Hardware	13	2,095
Iron, pig, tons	3,858	75,006
Iron, sheet, tons	33	2,586
Iron ore, tons	197	570
Iron, cotton ties	314	1,119
Iron, other, tons	1,113	32,579
Machinery	258	25,074
Metal goods	574	26,682
Nails	1,056	5,331
Needles	34	12,502
Nickel	15	2,190
Old metal	...	19,101
Per. caps	1	200
Pins	4	319
Quicksilver	1,350	35,333
Saddlery	24	4,036
Steel	75,634	136,760
Silver ore	34	80
Tin, bxs	55,706	257,738
Tin, bbls	25	1,220
Tin, 7,779 slabs, 718,524 lbs	...	156,445
Wire	1,460	12,598
Zinc, lbs	9,916	469
Zinc oxide	200	2,015

The quantity of hardware and metals imported compares with previous dates as follows:

	For the week.	22 weeks of 1883.	Same time 1882.
Cutlery, pkgs	149	3,072	3,155
Hardware, pkgs	13	635	477
Iron, R. R., bars	...	6,324	70,841
Lead, pigs	...	3,847	16,544
Steel, pkgs	75,634	699,452	857,465
Tin, bxs	55,706	774,834	953,007
Tin slabs, lbs	718,524	9,236,872	7,143,302

EXPORTS OF SPECIE.

For the week ended June 2:

Total	$154,000
Previously reported	6,357,011
Total since January 1, 1883	$6,511,011
Same time in 1882	29,147,548
Same time in 1881	4,877,400
Same time in 1880	4,148,125
Same time in 1879	9,748,955
Same time in 1878	8,127,805
Same time in 1877	16,616,409
Same time in 1876	25,549,171
Same time in 1875	42,566,803
Same time in 1874	24,934,946
Same time in 1873	23,859,519
Same time in 1872	30,499,900

EXPORTS EXCLUSIVE OF SPECIE.

For the week ended June 5:

	1881.	1882.	1883.
Total	$6,617,107	$6,504,682	$6,445,921
Prev. reported	155,643,854	128,559,993	144,710,561
Since Jan. 1	$162,260,961	$135,064,675	$151,156,482

PHILADELPHIA.

(By Telegraph to The Iron Age.)

PHILADELPHIA, June 6, 1883.

A sale of foreign Bessemer Pig has been made to-day at $21.25.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, June 5, 1883.

Pig Iron.—The market appears to be a trifle steadier, and although there has been no great demand, holders are evidently less disposed to make concessions than they were a few days ago. The general impression seems to be that prices have touched bottom, and while no advance is likely to take place, there may be increasing scarcity of choice brands. Some of the furnaces are pretty well sold up, and as regards favorite brands and many which are known as the best standards, there is already a demand pretty well up to the supply. The strength of the market, therefore, is chiefly in this class of Iron, other descriptions being in large supply and available at prices varying according to circumstances. It is difficult to quote with precision, some holding No. 1 Foundry at $22, f.o.b. cars at furnace; others are pressing sales at $18.50 @ $19.50, while Southern and other comparatively new brands are offered at $21, delivered. The announcement by the Thomas Iron Co. of a reduction to $20, delivered, for No. 1, and $19 for No. 2, has been discounted for some time, so that it has had no appreciable influence on the market so far. No. 2 Foundry is irregular at figures ranging from $17.50 to $18 at furnace, or $19 to $19.50, delivered. Mill Irons are fairly steady; some brands may be called firm, but the market has an uneven appearance, and prices are difficult to quote, except for the best makes, which sell at from $18 to $19, f.o.b. cars at furnace. There are plenty of sellers at less money, however, say $17 @ $17.50, but the brands, being comparatively new or unknown, are sold with greater difficulty than others at the higher figures. Several lots of White and Mottled Iron have been offered, and sales made at $15.50 and $16.50, respectively, for furnace deliveries. Cold-blast Charcoal Iron sold at $31, delivered, for 100-ton lots, choice quality; others dull and neglected. While the general feeling is unquestionably of a more settled charcter than it has been, buyers have not shown much willingness to increase their orders, so that as yet the improvement is rather one-sided. For this reason it might prove somewhat premature to make very sanguine predictions as to the future, although it is satisfactory to note something of a check to the declining tendency which has prevailed for so many weeks. It is thought that the next four weeks will develop the position more clearly; in the meantime, transactions are within the limits already named, and chiefly of a hand-to-mouth character, although an offer of $20, delivered, for 1000 tons Allentown was made and declined.

Bessemer Pig.—There is some little inquiry, but buyers appear to be very indifferent, with $21 as the best bid for summer shipments. Sellers ask $21.50, and are inclined to meet buyers half way, although the uncertainty in freights stands in the way of prompt acceptance of the offer made.

Spiegeleisen.—The same remarks apply in this case; $31.50 asked for shipments of 20 %.

Muck Bars.—The demand has been somewhat active, and prices for good Bars have been well maintained at $34 @ $35 at mill. Several sales have been made at $33 @ $33.50, but deliveries were less favorable to the buyer.

Blooms.—Market very quiet, but for good brands makers quote same as before, viz.: Charcoal Blooms, $59 @ $61; Run-out Anthracite, $50 @ $52; Scrap Blooms, $45 @ $46; Northern-Ore Blooms, $43 @ $44.

Bar Iron, Plates, &c.—The feeling is somewhat unsettled, owing to the unexpected action of manufacturers in the Western portion of the State. Some very good contracts have been taken within the past two or three weeks, and order books are in better condition than they have been for a long time, but the signing of the scale in the West has taken most people by surprise and led to serious apprehension as to the future course of the market. The demand is not nearly equal to the supply, and if production is going to be kept up all summer, there is no alternative but lower prices. Locally, as already stated, the mills are in pretty good shape, and, with the usual shutting down for repairs, stock-taking, &c., a fair business may be considered assured for the next two or three months. In other words, the output from now to September will not average much beyond what is made in two ordinary months, so that the current demand for small lots, in connection with orders already entered, will probably keep things moving until August at something near the present range of prices. This is the most that can be expected, while some are of opinion that prices cannot be sustained even for that length of time. Whatever the result may be, the trade are in the meantime all adrift, and hardly know what course to pursue. The orders recently taken, and which were pretty evenly distributed, will keep most of the mills occupied for a while, but it is difficult to know what quotations to make on new business. Prices had improved nearly a tenth, but the margin is said to be very trifling, and will be lost entirely at the figures quoted by outside concerns. Sales during the week have been on the basis of 2.2¢ for Best Refined Bar Iron in lots of 50 tons and upward; small lots have been placed at slightly higher figures. Rates to-day are nominally the same, but there is less disposition to buy, and it is hardly likely that more than 2.15¢ could be obtained for good-sized lots. The demand has been pretty well supplied for the present, however, so that 2.2¢ @ 2.25¢ may be quoted as a nominal rate, with very few inquiries, except for small lots. Some country mills are offering Bars at 2¢ @ 2.1¢, but quality or finish is understood to be in proportion. Old Rail Iron is offered at 1.85¢ @ 1.9¢. Skelp Iron is in fair demand and held at 2.15¢ for grooved, which appears to be beyond buyers' views. Heavy Plate Iron has been sold to a larger extent than usual, one lot of 600 tons having been taken for boat building by Detroit parties, similar lots for the Philadelphia shipyards, besides numerous lots of 50 to 200 tons each in other directions. Prices have not been fully maintained, however, 2.3¢ at mill having been shaded for Boat Plates, besides similar concessions on the higher grades. At the same time it can be said that mills are in better shape than they were some time ago, and are in a position to command fair prices for summer work. Sales of small lots at the following prices: Tank Iron, 2.4¢ @ 2.5¢; Shell, 3¢ @ 3.25¢; Flange, 4¢ @ 4.25¢, and Fire-Box, 5¢ @ 5.25¢.

Structural Iron.—The demand has been fair, but no very large lots have been placed. Shipbuilders have taken one or two good-sized lots, but the general demand is not of special importance. Prices are steady as last quoted, say: Angles, 2.3¢ @ 2.4¢; Tees, 3.2¢, and Beams and Channels, 3.5¢.

Sheet Iron.—Market somewhat unsettled for ordinary qualities, and prices inclined to weaken on offers for good-sized lots. Small lots are held at former quotations, but the demand is slow and disappointing. Prices as follows:

Common Sheets, No. 28	4⅛¢
Common Sheets, Nos. 26 and 27	4¼¢
Common Sheets, No. 21 to 25	4 ¢
Common Sheets, No. 18 to 20	3¾¢
Best Refined, ¼ % advance on the above.	
Best Bloom Sheets, No. 26 to 28	6¼¢
Best Bloom Sheets, No. 22 to 25	6⅛¢
Best Bloom Sheets, No. 16 to 21	6¼¢
Common Red Plates, 3-16 to 16	3.2¢
Best Bloom; Galvanized, discount	40 %
Second quality, discount	50 %

Steel Rails.—The market is devoid of all features of interest, and sales are chiefly small lots at prices ruling for several weeks past. Reports are current of a sale of 10,000 tons for summer delivery at $37.50, but we have not been able to verify the transaction, although it is probably correct. Several sales have been made at $38, and as the mills are pretty well filled up for summer, concessions cannot readily be obtained, although they might be had for winter deliveries. Light Rails in good demand at the usual advance.

Railway Fastenings.—The demand for Spikes is fair at 2.4¢ @ 2.5¢ for Ordinary and 2.5¢ @ 2.6¢ for Rolled Points. Fish Plates quiet and steady at 2.2¢ @ 2.3¢.

Old Rails.—The market is very irregular, small lots of Pennsylvania Rails having been sold at $23.50, Philadelphia, while Southern and Foreign are offered for shipment at $22.50 without attracting attention. Market quiet, with tendency toward lower prices.

Scrap Iron.—Choice lots No. 1 command $24.50 @ $25, but a large proportion of the offerings are sold at $23 @ 24, good qualities being very scarce. Cast Scrap is very quiet at about $18. Old Fish Plates offered at $28.50, with $28 bid. Old Horseshoes held at about $30 @ $31 for 100-ton lots.

Wrought Iron Pipe.—There is very little of interest in this department. In most cases small lots continue to be called for, which gives the market a very quiet appearance. We quote as follows: 57½ % @ 60 % off list prices on Boiler Tubes, and 70 % off on Gas and Steam Pipe. On special sizes further discounts could probably be had, according to quantity required.

Nails—Have been moving off pretty freely on small lots during the week. The inquiries from the West and other points deriving their supply from Pittsburgh, noted last week, have been withdrawn from the market; prospects, however, point to a continued fair local demand. The usual selling price may be given at about $3.15.

PITTSBURGH.

Office of *The Iron Age*, 77 Fourth Avenue, PITTSBURGH, June 5, 1883.

The signing of the wage-scale by the iron-masters, on Friday last, created great astonishment, as a lockout was confidently expected in the event of the workers refusing to accept the terms proposed by the mill owners. However, the latter, as it now appears, had good reasons for doing just as they did, and the outside public, as might be expected, are very much elated over the fact that the matter has been disposed of for another year. It was developed at the meeting of the conference committees, which was asked for by the manufacturers, that a number of mills—three here, some at Wheeling and elsewhere west of Pittsburgh—either had signed or would sign the scale and keep their mills in operation, it apparently being their intention to take advantage of the lockout to get the trade of the mills stopped, and in order to frustrate their plans the mill owners of Pittsburgh, at the last minute, turned around and acceded to the demands of the Amalgamated Association and renewed the wage-scale of 1882–83. It is well to bear in mind, however, that signing the scale does not oblige mill owners to keep their mills running; the probability is that most of them will continue in operation this month, but unless there is a decided change in the situation in the meantime there will no doubt be a pretty general shut down in July. Some mill owners contemplate making extensive repairs, which will require a stoppage of several weeks, and they think it best to make these repairs before the fall trade opens up. Besides, the workers, if there is to be a stoppage, would like to have it take place during the hot season.

Considerable commotion was created to-day by the report that several firms were financially embarrassed, but upon investigation it was ascertained that it all originated from a demand made by the Grafton Furnace Co. for an extension. A couple of prominent Pittsburgh firms hold stock in this furnace company, but they will be abundantly able to stand their part of an assessment if it should come to that. It is thought there will be no trouble in obtaining the extension asked for. The Marshall tangle has not been unraveled yet; on the contrary, it is becoming more complicated. It is the intention of some of the unsecured creditors to hold the Marshall estate, and steps to this end have already been taken.

Ore.—There is nothing new to report; business continues very dull, with but little prospect of any immediate improvement. So many idle furnaces is hard on the Ore trade, and the low prices of American Ores have for the present shut out the foreign Ores.

Pig Iron.—The fact that there is to be no lockout has created a better feeling in Pig Iron circles, although the indications are that the hand-to-mouth policy will be adhered to until after the stock-taking in July and the outlook for the fall trade shows up. As already stated, it is expected that a number of the mills will shut down next month, and, with but little prospect of any advance in the near future, it is not to be expected that consumers will feel like anticipating future wants. Some of the mills have little or no stock, and will be obliged to replenish, but, as a rule, they will not go beyond a week's supply; hence the prospect, as regards any immediate improvement, is not very encouraging. Quotations may be given as follows:

No. 1 Foundry	$21.50 @ 22.00,	4 mos.
No. 2 "	19.00 @ 20.00,	4 "
Neutral Forge	17.50 @ 18.50,	4 "
Foundry Charcoal	26.00 @ 27.00,	4 "
Cold-Blast Charcoal	28.00 @ 33.00,	4 "
Bessemer	21.00 @ 21.50,	4 "

Muck Bar.—There is an occasional sale, but, as a rule, the market is quiet and prices remain unchanged. Sales have been made at $34 @ $34.50, cash, for good strong Neutral. Possibly, now that there is to be no lockout, there may be an increased demand before the close of the month. As compared with a year ago, prices are $9 @ $10 ₱ ton lower.

Manufactured Iron.—What the effect of the action of the mill owners, already referred to, will be has not yet been developed, but it may reasonably be assumed that the demand created by the apprehension of a stoppage will subside, and mill owners no doubt will be asked to cancel a good many orders that were placed in expectation of a lockout and a desire to bridge it over. Prices are easier, but we continue to quote on a basis of 2¢ for Bars for assorted orders, 60 days, 2 % off for cash.

Nails.—The Nail mills are still busy, having about all they can do, but, now that there is to be no lockout, the desire of jobbers and consumers to anticipate future wants will no doubt subside, although the indications are that there will be a more active trade this summer than for several years past. There is no stock either here or at Wheeling, and it is safe to assume that manufacturers will have all they can do up to the first of July. Prices remain as last quoted, $3 @ $3.10, 60 days, 2 % off for cash. Possibly the abatement of 10¢ ₱ keg would now be allowed on desirable orders of carload lots and upward.

Wrought Iron Pipe.—There is a fair business, but on account of the action of the Iron manufacturers prices are easier, but without quotable change. Discounts on Gas and Steam Pipe, 70 and 5 %; on Boiler Tubes, 55 and 5 %; Oil-Well Casing, 45¢ @ 50¢ ₱ foot; do. Tubing, 15¢ @ 17¢.

Steel.—The Merchant Steel trade continues much the same as noted in our last report; business dragging and prices weak and irregular, with more or less cutting, especially as regards the lower grades.

Old Rails.—Since our last a sale of 2500 tons American Tees has been reported for June and July delivery at $22.50, but one of our largest consumers refuses to pay more than $22. Brokers say that they can find no lots for immediate delivery under $23, some sellers refusing to sell under $23.50. After this year it is believed there will be a scarcity of Old Rails, as, in consequence of the low price of Steel, there are no Iron Rails being put down.

Steel Rails.—There is nothing new to report. Mills continue to have all they can do. Some of them are sold up until October. Prices remain unchanged; Heavy Sections, $39 @ $40, cash, at mill.

Railway Track Supplies.—Railway Spikes, 2.60¢, 30 days; Splice Bars, 2¢; Track Bolts, 3.25¢ with Square and 3.35¢ @ 3.40¢ with Hexagon Nuts.

Scrap.—Scrap continues very dull, and there is so little doing that it is difficult to give reliable quotations. No. 1 Wrought is nominal at $22 @ $23 (net ton) for Ordinary, and $24 @ $25 for Selected Railway; Old Car Axles, $32 @ 33; Crop Ends, $25, gross; Old Car Wheels, $21 @ $22; Cast Borings, $13 @ $14.

Coke.—There is no improvement to note in this important interest. Prices are still quoted at 90¢ @ 95¢ ₱ ton, free on cars at ovens.

Window Glass.—There is possibly more doing, but business still continues slow and prices remain unchanged.

CHICAGO.

Office of *The Iron Age*, 36 and 38 Clark St., cor. Lake, CHICAGO, June 4, 1883.

Hardware.—The Hardware trade during the week past has been fair, and continues so at present writing; prices have a slight downward tendency, however.

Nails.—An active demand continues to exist in this market for Nails, which are held firm at $3.25 ₱ keg for 10d. to 60d. sizes in small lots, with the usual 2 % off for cash, and an additional 10¢ for carload lots. Jobbers' stocks are light and badly broken, and they buy only in small lots.

Manufactured Iron.—Trade in Merchant Iron is fair; the market continues firm, with quotations unchanged. We quote Bar, 2.20¢ @ 2.30¢ rates; Angle Iron, 3¢ @ 3.20¢ rates; T Iron, 4¢ rates; Beams, 3.80¢; Channels, 3¢; Tank Iron, 2.80¢ @ 3¢ rates; Sheet Iron, 3¢ @ 3.20¢ rates; Norway Original Bars, 4½¢ rates; Norway Re-rolled Bars, 5½¢ rates; Ulster, 4½¢ rates; Low Moor Iron, 8¢ rates; Nuts and Washers, 8¢ off list; Wrought Boat Spikes, 3¢ rates.

Pig Iron.—Buyers seem to have more confidence in the market than heretofore, and consequently are placing their orders more freely, but in a small way only. The stocks of Lake Superior Charcoal and Southern Coke Irons are reported as being small. We quote as follows: Lake Superior, Nos. 1 and 2, $23.00; No. 3, $24, and Nos. 4, 5 and 6, $25, 4 mos.; Briar Hill, $25; Himrod, $23; Silvery Soft, $23 @ $24; Crane No. 1, $25; No. 2, $24; Thomas, $24 @ $26; American Scotch, $24 @ $25; Du Val, No. 1, $23.50; No. 2, $22.50; Fulton Notch, No. 2, $22.50; No. 3, $21.50; Calumet, $23 @ $23.50, 4 mos.; Imported Scotch, $27 @ $28; Southern Coke, No. 1, $23.85; No. 2, $22.35; Low Moor, No. 1, $24; No. 2, $22.75, 4 mos.

Steel.—The market is rather quiet, and a weak tendency is to be noted; there are, however, no changes in quotations. We quote as follows: Tool, 11½¢; Machinery O. H., 5¢; Crucible Machinery, 7¢; Hammer, 2 inches and under, 8¢; over 2 inches, 9¢; Cast Spring, 6¢, and O. H. Spring, Tire and Sleigh Shoe, 5¢; Sheet, first, second and third quality, 12¢, 10½¢ and 8½¢ respectively; Crucible Plow, 6¢; Eagle Plow, 5¢; Iron Center Plow, 9¾¢, and Soft Steel Center Plow, 9¾¢; Cast Plow, 5¢; German Plow, 4½¢.

Scrap Iron.—Trade continues quiet, and quotations still have a downward tendency. We quote as follows, which are dealers' purchasing prices: No. 1 Railroad Wrought Scrap, ₱ net ton, $21; No. 1 Country Wrought Scrap, ₱ net ton, $18; No. 1 Cast Scrap, ₱ ton, $15; No. 1 Stove Plate Scrap, ₱ ton, $10; Machine Shop Wrought Turnings, ₱ ton, $9; Cast Iron Borings, $7; Old Plows and Plow Steel, $12; Malleable Scrap, $5.

EVERETT & POST, 156 Lake street, report to us as follows, under date of June 2, 1883: *Connellsville Coke.*—Coke is quiet again this week. There is some probability that several large producers will form a combination to limit the production, and thereby control the price. This, with the partial resumption of the Iron and Steel works throughout the country, may have a tendency to stiffen prices. The present is a good time to make contracts. Prime Foundry is quoted about $5.50 ₱ ton, f.o.b. Chicago; Crushed Coke about $6.10, f.o.b. Chicago. *Pig Lead.*—The steadiness of Pig Lead in this market is quite noticeable. During the past three weeks prices have ranged from $4.15 to $4.17½. The past week has developed sales of 300 tons Common and Refined, June delivery, at above figures. The quantity of Lead in sight for prompt delivery is very small, and most of the Lead now offering is for future delivery on a basis of $4.20 or thereabouts.

CHATTANOOGA.

Office of *The Iron Age*, Market and 8th Sts., CHATTANOOGA, June 4, 1883.

Summer seems to be here at last, and to stay. The weather is hot and dry. General business is as good as ought to be expected at this season, considering all the drawbacks. Merchants report collections as easy as they had counted on. Failures are few, and of no great consequence in any case.

Pig Iron.—The Southern market will hardly be much helped by the turn of the labor hitch in the Northern districts; the effect will rather be depressing than otherwise. Sales continue small; prices the same as before reported. We quote: No. 1 Foundry, $19 @ $20; No. 2 Foundry, $17 @ $18; Gray Forge, $16 @ $17; White and Mottled, $15 @ $16.

Ores.—We quote: 50 % Brown Hematite, ₱ ton, $2 @ $2.75; Red Fossil, $1.75 @ $2, delivered at furnace.

Miscellaneous Articles.—Old Rails are plenty and weak at $22 @ $23; Wrought Scrap, $18 @ $20; Cast Scrap, $11 @ $12; Old Wheels, $22.

Nails—Continue good; sales at $3; $3.10 in a jobbing way.

Manufactured Iron.—Bar is dull at 2¢, carload lots; Railroad Spikes, $3; Track Bolts, $3.20; Fish Plate, $2.

Coal.—We quote: Fancy Lump, $3; Common, $2 @ $2.50; run of mine to manufacturers, $1.75 at mills.

Coke.—We quote: Furnace Coke, $3 at point of consumption; Foundry, 10¢ @ 12¢ ₱ bushel.

CINCINNATI.

JUNE 4.—*Pig Iron.*—The market in all its features remains about as last report, except that now that the impending strike among the rolling-mill operators is past, there is some inquiry for Forge Irons, but at prices that are thought to be a concession on former quotations. Foundries throughout the West report an encouraging outlook in the demand for Machinery, many of the prominent ones having taken orders filling their works through the summer. The Car builders and Car-Wheel foundries report substantial encouragement—that the full capacity of their works will be required to meet the demand from railroads for legitimate uses. Quotations: Best brands H. R. C. C. Foundry, $25 @ 25.50; Good, No. 1, $24 @ $24.50; Southern, $22 @ $22.50; H. R. Coke, $22 @ $22.50; Southern, $20.50 @ $21; No. 2, above kinds, 50¢ @ $1 less. American Scotch, No. 1, $21 @ $21.50; No. 2, $19.50 @ $20.50; Silver Gray Softeners, $20 @ $21; No. 2, $19; No. 3, $18.50; Forge, $17 @ $23 for range S. C., Coke and C. C; Cold Blast C. C. Car Wheel, $27 @ $29; Warm Blast, $25 @ $27.

LOUISVILLE.

GEO. H. HULL & CO., Commission Merchants, report to us as follows, under date of June 2, 1883: The market for Pig Iron of all grades continues very dull. There is a wide difference between the views of buyers and sellers, and sales in consequence are restricted. We quote for cash, in round lots, as below, but quotations must be regarded as merely nominal:

FOUNDRY IRON.

No. 1 Hanging Rock Charcoal	$25.00 @ 26.00
No. 1 Southern Charcoal	23.00 @ 23.50
No. 1 Hanging Rock Stonecoal and Coke	20.50 @ 22.50
No. 1 Southern Stonecoal and Coke	20.50 @ 22.50
No. 2 Southern Stonecoal and Coke	20.00 @ 20.50
"American Scotch"	19.00 @ 20.00
Open Silver-gray	19.00 @ 19.50
Close Silver-gray	16.50 @ 18.50

MILL IRONS.

No. 1 Charcoal	20.00 @ 21.00
No. 1 Stonecoal and Coke, Neutral	18.50 @ 19.50
No. 2 Stonecoal and Coke, Neutral	17.50 @ 18.50
No. 1 Stonecoal and Coke, Cold-short	18.00 @ 18.50
No. 2 Stonecoal and Coke, Cold short	17.00 @ 18.00
White and Mottled, Cold-short and Neutral	16.00 @ 17.50

CAR WHEEL IRONS.

Hanging Rock, Cold-blast	32.00 @ 35.00
Hanging Rock, Warm-blast	25.00 @ 27.00
Alabama and Georgia, Warm and Cold-blast	26.00 @ 27.00
Central Kentucky, Cold-blast	25.00 @ 27.00

W. B. BELKNAP & CO., Iron and Steel Merchants, Nos. 115 to 121 West Main street, report to us as follows, under date of June 2, 1883: The past week has been one of exceptional activity for this season of the year. On the last two days of the month orders for Iron, Nails, and heavy goods generally, poured in by mail and wire. The mills responded to this demand promptly, and prices for Sheet and Bar advanced $3 to $5 ₱ ton in 24 hours. A lockout at Pittsburgh was generally counted on, and the strike at Cincinnati seemed to have taken definite shape by May 30. No bubble ever burst more suddenly, however, and all the circulars declaring the unanimity of manufacturers to bring about a lower scale, and the predictions of "the inevitable," all went for nothing. It was a verification of the old French proverb, "It is the unexpected which happens." The pin which pricked the bubble, we take it, was jealousy—a very natural unwillingness, even on the part of a large majority of mills, to make the fight while others stayed out and reaped the benefit of the higher prices that would necessarily prevail. We may now, if all the mills run, expect a corresponding period of dullness till the market settles. Cards from the brokers and mills generally are being liberally distributed announcing empty order books and a willingness to fill up. A lapse to previous prices, if not to something lower, seems the inevitable thing now. Prices now about as follows: Bar Iron, 2.15¢ @ 2.25¢; Heavy Sheet, 3.10¢ @ 3.20¢; Light Sheet, 4¢; Nails, $3.15 @ $3.25.

ST. LOUIS.

HOFFER & CO., Pig Iron and Iron Ore Merchants, 417 Pine street, report to us as follows, under date of June 2, 1883: Owing to the anticipated strike business has been very dull, but, now that the strike has been averted, we hope for more trade:

HOT BLAST CHARCOAL IRONS.

Missouri	$21.00 @ 22.00
Southern	22.00 @ 24.00
Ohio	27.00 @ 29.00

COAL AND COKE IRONS.

Missouri	21.00 @ 22.00
Southern	20.00 @ 22.50
Ohio	21.00 @ 26.00

MILL IRONS.

Red Short	19.00 @ 20.00
Neutral	18.00 @ 19.00

CAR WHEEL AND MALLEABLE IRONS.

Missouri	21.00 @ 22.00
Southern	25.00 @ 30.00
Ohio	25.00 @ 35.00

RICHMOND.

ASA SNYDER, Iron Merchant and Furnace Agent, writes as follows, under date of June 4, 1883: A healthier condition of our Iron market is manifest. The usual semi-annual stoppage for repairs and inventory is close at hand, and small orders prevail. Last week's quotations are maintained:

No. 1 Scotch Pig Iron	$23.50 @ 26.50
No. 1 Anthracite Pig Iron	21.00 @ 24.00
No. 2 " "	20.00 @ 22.00
No. 1 Virginia Coke Pig Iron	21.00 @ 22.50
No. 2 " "	20.00 @ 21.50
No. 3 " "	19.00 @ 20.00
White and Mottled	17.00 @ 19.00
Virginia C. B. Charcoal	26.00 @ 28 00
Old Dom Nails (carload lots)	3 00 @ .....
Old Iron Rails	21.00 @ 22.00
Old Car Wheels	18.00 @ 20.00
Wrought Scrap, No. 1	19.00 @ 20.00
Cast Scrap, No. 1	18.00 @ 19.00
Richmond Refined Bar Iron	2 2-10¢ base
Horse Shoes (Tredegar)	4.25 @ ....
Mule " "	5.25 @ ....

BALTIMORE.

W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following, under date of June 4, 1883: There has been a decided improvement as to inquiry and trade for the past week. The adjustment of the labor question leaves us with a steady market, accompanied by more uniform values:

Ref. Bar Iron, 1 to 6 x ⅜ to 1	℔	2¼ @ 2.35¢
" " 1 to 4½ x 1½ to 1	℔	2¼ @ 2.35¢
" " ¾ to 2, Round and Square	℔	2¼ @ 2.35¢
Hoop Iron, 1½ wide and upward	"	3 2-10 @ 3 3-10¢
Band Iron, from 1½ to 6 in. wide	"	2 7-10 @ 2 8-10¢
Horse-shoe Iron	"	3¼ @ 3½¢
Norway Nail Rods	"	5¼ @ 5½¢
Black Diamond Cast Steel	"	11 @ 12 ¢
Machinery Steel	"	4½ @ 5 ¢
Spring Steel	"	4 @ 4¼¢
Common Horse Nails	"	10 @ 11 ¢
Railroad Spikes, 5½ x 9-16	"	2 6-10 @ 2 7-10¢
Perkins' Horse Shoes, ℔ keg of 100 ℔		$4 37½
" Mule Shoes		5.37½

R. C. HOFFMAN & Co., Pig and Railroad Iron, No. 21 South Frederick street, report us as follows, under date of June 4: The Iron market continues dull and sales light. Prices for best brands of Iron are fairly maintained, but for low brands the tendency is downward. We quote prices about as follows:

Best Charcoal Wheel Iron (all Bolt Iron)	$28.00 @ 30.00
Virginia C. B. Wheel Iron	28.00 @ 30.00
Anthracite, No. 1	21.00 @ 23 00
" No. 2	19.00 @ 20.00
" No. 3	17.00 @ 18.00
" Mottled and White	15.00 @ 16.00
Charcoal C. B. Blooms	58.00 @ 60.00
Refined Blooms	45.00 @ 50.00

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From Our Regular Correspondent.)

LONDON, ENG., May 21, 1883.

THE WEEK

has been so largely devoted to the Whitsuntide holidays that scarcely any business has been done, either on the exchanges or at the works. In a few instances the doors were reopened to the workmen on Thursday last, but more generally the resumption only takes place to-day, or even to-morrow, inasmuch as in many parts of the North country Saint Monday reigns supreme, quite irrespective of a preceding whole week's holiday or not. If I am not misinformed, many of the ironmasters and their near industrial allies have been well pleased with the occurrence of the holidays just now, and would not have been sorry if they could have decently made the recess a fortnight instead of a week. The stoppage of production has been welcomed under the circumstances, although at the blast furnaces and in some other departments the hiatus has caused additions to stocks. The leisure afforded from this cause has emphasized the previously expressed opinion that in many sections of the iron and steel trades the current volume of production is still much too heavy for the consumptive requirements of the market. Efforts are being made on all sides to economize prime costs, and these efforts are largely successful, but they cause the make to be so overdone that the general effect of the prime cause is swamped, and the practice of a no doubt laudable individual economy yields no relief to the trade as a whole, but rather the contrary. To some this may seem somewhat paradoxical, but a little thought bestowed on the problem will show that what I have outlined is an existing and awkward fact. At the same time it is abundantly manifest that individual economy in iron-making is an absolute necessity, for in its absence iron cannot be placed before consumers at prices which will tempt them. If cheap production be only secured by dint of a larger output, thereby spreading the average cost per ton over a larger quantity, it is pretty plain that the end is only deferred, seeing that where such "economy" is widely practiced, the market must be speedily swamped and values again forced down. This process on such a false basis might be repeated *ad infinitum*, were it not for regulating causes which are patent to everybody; hence, in the long run, the truer economy, which consists in reducing prime costs and utilizing every atom of by-products, must prevail. At the moment, it is not at all too clear which rule is governing the procedure of our ironmakers. The best firms, I have no doubt, are working on an intelligible and intelligent basis, with a well-formulated programme, and with their aims sharply defined. Of the majority, however, I am sorry to say I am by no means so certain; indeed, I am afraid they are running on lines which cannot fail to land them on the wrong side of the fence, besides being the source of confusion and embarrassment to the trade at large. I shall be only too pleased to find myself in error as time progresses, yet I shall be greatly mistaken if grave changes do not come about within this year. As the markets now stand almost all over the world, there can be no doubt whatever that we are producing vastly more iron than can be put into use. That is the case with you, and I feel assured that it is so with us, although we are not just now in a position to point out exactly under which thimble the pea is hidden. We must close up our ranks in any case, and in that process somebody or other will go to the wall. With yourselves the concerns badly located or poorly run will be weeded out, and with ourselves the smaller concerns or those lacking good management will disappear. Protection will not protect against this Medean law, nor will free trade afford safety against its decrees. Your market is even worse than our own (so I infer from published reports), and ours is about as bad in point of selling values as it can possibly be. There can be no mistaking the fact that this question of economical production is the question of the day. Its discussion occupied almost the whole time of the members of the Iron and Steel Institute at the recent meeting, and it is the theme of the trade journalists who faithfully embody and reflect the opinions of those actually engaged in the business. How it is to be satisfactorily solved I fail to see. That a solution is quite practicable we have any amount of contemporary evidence, but that anybody is satisfied with such solution I have yet to learn. On almost all sides the stocks of pig iron are largely increasing, and the utmost difficulty is experienced in effecting sales, yet there never was a time when more rigid economy was enforced or when the cost per ton at the furnaces was lower or nearly as low. This demonstrates beyond question that, although economy is a laudable and excellent thing in its way, it is in no sense a real solvent as applied to the relations of supply and demand.

THE IRON MARKET

is so quiet, as you will have inferred from a perusal of some of the foregoing observations, that it is a little difficult for even the most industrious scribe to thrash out anything new from the chaos by which he is surrounded for the time being. The extremely bright and warm weather of the past week has favored the holiday-makers, and has also rendered agricultural prospects somewhat brighter, besides giving a slightly more sanguine tone to the trade outlook in general. It is hoped and believed that the season, although very late, owing to the cold and dull spring, will not have had serious effects upon vegetation. Certainly the country looks remarkably well at present, with a finer prospect among the apples and pears, &c., than has been known for some years past. The fruit trees, indeed, are perfect masses of blossom, so that with no further frosts the fruit yield ought to be magnificent. The cereals are not up to the mark, the winter wheats being sickly and yellow, but the heat of the past week ought to fetch them round and set them going, just as the grass on the meadow lands has at length taken a most promising and flourishing departure. It will be some months, however, before we can hope to reap the "kindly fruits of the earth," so that we have as yet a period during which we must needs possess our souls in patience. During the interval something or other *now* unexpected *may* happen—it is axiomatic that it is the unexpected that does happen—but as far as we can see at present we have no better resource than to do the best we can under our ordinary surroundings.

At Glasgow the market seemed a trifle better toward the middle of last week, and warrants underwent a slight appreciation in value, but on the week the gain was only fractional, and it appears to have been an outcome of internal movements rather than of external pressure. Makers' brands of Scotch pig are steady, and there is still a considerable local sale, of which the pig imported from the Middlesboro' district by James Watson & Co. obtains its share. At Middlesboro' the changes of the week have been unimportant, No. 3 being nominal at about 40/ ℔ ton, with a disposition on the part of some of the merchants to cut under that low limit. The holidays have necessarily restricted the shipments, which for May are likely to be smaller than during April, as well as during May, 1882. On the West Coast matters are stationary, mixed lots being 50/ to 51/6, in usual proportions, with gradually growing stocks and a limited turnover. Deliveries on a fairly good scale are being made in fulfillment of contracts, but there is no speculation for a rise, and an almost moribund export demand. Everywhere else the sale of crude irons is very slow and difficult. The mills in the North of England devoted to the rolling of ship, armor and boiler plates are busily engaged, and have plenty of work in hand, but prices are low, save for armor, in which, as I have frequently explained, there is really no competition whatever. Only two firms are in the business, and as their directors and shareholders are largely identical, they know very much better than to compete with each other. The activity of the iron shipbuilding yards supports the call for plates, angles, bulbs, &c., and the pressure of work still experienced by the builders of marine, locomotive, portable and other engines keeps the boiler-plate mills fully occupied. I am informed that the principal agricultural engineering houses are largely oversold, some of them being busier than at any former juncture. The work is mostly on export account, and has been booked at prices which are alleged to be relatively very low. All grades of merchant iron are purely nominal, Staffordshire marked bars being £7. 10/; medium, £6. 10/ @ £7; ordinary, £5. 15/ @ £6. 5/; and common Welsh or Belgian, £5. 7/6 @ £5. 10/ for India assortments. It is years since prices of finished iron remained so dead, several months having now elapsed since it was necessary to adjust most of the leading figures for bars, sheets, hoops, &c. Speaking of hoops reminds me that J. Dawes & Co., of West Bromwich, are said to have received an American order for 2000 tons. This firm lays itself out somewhat for American business; hence it does not appear clear whether the order is a routine one or a special result of the tariff changes. Other firms, however, have inquiries from your side, but I do not hear of many orders as yet. Light iron rails are in some demand at high prices. Old rails are about 67/6 ℔ ton, f.o.b. London, for D. H., but United States offers are checked by the relatively high rates of freight and by limited stocks. There is scarcely anything to be reported in heavy wrought scrap iron, which is called 57/6 @ 60/ ℔ ton, f.o.b. London, for No. 1 parcels. There is no export demand for Bessemer blooms, and rail crop ends are quieter at 60/ @ 61/6 ℔ ton, run of the mill. Old railway leaf spring steel is dull at about £4 ℔ ton. Steel rails are very dull and are rapidly going toward zero in the matter of prices. The mills are still fairly engaged, but new orders are very scarce indeed. I should quote ordinary heavy sections at from £4. 12/6 to £5, and should not be surprised to hear of £4. 7/6 being accepted in one or two quarters.

SCOTCH PIG IRON

is quiet, with warrants almost on precisely the same level as a year ago. As a matter of fact, they stood at 47/4 @ 47/7 on May 20, 1882, and to-day are at 47/3 @ 47/5, although the reserve stock is now 57,000 tons less than it was this date last year. There are now 116 furnaces at work in Scotland (including 9 on hematites), as against 109 a year ago. In Connal's Glasgow stocks the quantity held is 579,371 tons, against 636,251 tons this date 1882. Shipments to date have decreased by 7950 tons, although last week they were 1300 tons better than in the corresponding week of 1882. The importations of Middlesboro' pig iron into Scotland have reached 92,672 tons, or 1690 tons above those of 1882 to same date. Writing from Glasgow, on May 19, James Watson & Co. said: "The Scotch iron market remains very quiet, without much alteration in the price of warrants, only a limited business being transacted. The demand for shipping brands is quieter than it was, although shipments continue good. The Middlesboro' iron market is very steady. The warrant market here was closed on Monday last and on Tuesday it was firm, with a moderate business done between 47/5 and 47/7½, cash. On Wednesday the price relapsed to 47/5 ℔ ton. Yesterday the market fluctuated between 47/4½ and 47/6, while to-day business was done from 47/5 to 47/3, closing with sellers at the latter figure. The shipments last week were 16,296 tons, as compared with 14,982 tons for the corresponding week of last year." We quote:

	No. 1.	No. 3
G. M. B., at Glasgow	48/6	46/6
Clyde, "	50/9	48/9
Coltness, "	63/	54/6
Langloan, "	61/	54/6
Gartsherrie, "	59/	54/
Summerlee, "	60/	51/
Calder, "	60/6	51/6
Carnbroe, "	55/	49/
Glengarnock, at Ardrossan	54/6	48/
Eglinton, "	48/6	46/
Dalmellington, "	49/6	46/6
Shotts, at Leith	62/	56/
Kinneil, at Bo'ness	48/6	47/6
Carron, at Grangemouth	50/	48/6

MIDDLESBORO' PIG IRON

is still dull and without any movement of appreciable note. The shipments to Belgium, France, Holland, &c., are on a large scale, but are below the figures for the same month of last year. No. 3 is nominal at 40/, and there seems to be no prospect of any early change for the better. For G. M. B., f.o.b. at makers' wharves in the Tees, net cash prices, less 2½, are as follows:

No. 1 Foundry	44/	Mottled	38/6
" 2 "	42/	White	38/
" 3 "	40/	Refined Metal	56/6
" 4 "	39/3	Kentledge	41/6
" 4 Forge	39/	Cinder	38/

"Redcar" brand is: Foundry No. 1, 44/; foundry No. 3, 40/; gray forge No. 4, 39/, all f.o.b. or free on rail at works, and for net cash only.

HEMATITE PIG IRON

is lifeless in all directions, in spite of the settlement of the wages dispute by compromise and a commencement in the way of restriction. Stocks continue to increase (there being over 56,000 tons in one store alone), so that prices have little chance of being amended. Mixed parcels are called 50/ @ 51/6, in usual proportions, and West Coast brands are as under:

	No. 1.	No. 2.	No. 3.
Cleator	56/	55/6	55/
Lonsdale	52/6	51/6	51/
Workington	52/	51/6	51/
West Cumberland	....	....	....
Lowther	52/	51/6	51/
Moss Bay	....	....	....
Distington	52/	51/6	51/
Harrington	52/	51/6	51/
Solway	52/	51/6	51/
Maryport	52/	51/6	51/

Last week's shipments included 14,264 tons of pig iron and 7776 tons of steel rails.

TIN PLATES

remain in a singularly lethargic condition, despite the existence of a moderately steady demand and the alleged decreased make. The home consumption, however, is not up to an average, besides which it is believed that the very heavy stocks thrown into your market at the beginning of the year by two rival houses on this side have not yet been worked up. Average prices may be called: Best charcoal, 19/6 @ 21/; seconds charcoal, 18/6 @ 19/; best coke, 17/ @ 18/; seconds coke, 16/6 @ 17/; common coke, 16/ @ 16/6, and wasters, 14/6 @ 14/9, ℔ box I. C. Messrs. Caine & Layborne, Liverpool, advise me: "There is no material change to record in the market. The demand continues steady, but not in such volume as to improve prices, which still remain firm at about 16/ @ 16/6 for cokes, and 18/6 @ 19/ for ordinary charcoals. It is hoped next month will bring with it an increased demand for the American market and a consequent improvement in values, but there are some whose expectations are not sanguine in this direction."

FOREIGN.

FRANCE.

(Moniteur des Interets Materiels.)

PARIS, May 20, 1883. — *Metals.*—Crop weather having improved, there is a better feeling in general business, but as Metals have remained inactive, prices thereof have been barely sustained at ensuing quotations: *Copper.*—Chili Bars, 160 @ 163.75; Ingots and Slabs, 172.50, and Best Selected, 172.50. *Tin.*—Banca, 260; Billiton, 255, and Straits, Australian and English, 252.50. *Lead*, 32.50 @ 33, and *Spelter*, 39.25 @ 39.75. *Iron.*—The market in France continues quite heavy; further curtailment of production is spoken of. In the Longwy group, despite the large shipments of Pig Iron, which in April exceeded 30,000 tons, reducing the stock 5000 tons, it has been resolved to blow out the sixth blast furnace. An understanding has been sought to be arrived at with the owners of several blast furnaces now being built, and that were to be blown in in September, to let them stand idle. At the North orders are scarce, so that stocks hardly diminish; it is consequently as good as certain that work will be reduced even more than this month, for the month of June; this month, five days per week are worked. The idea of forming a syndicate to sell to consumers in this city direct meets with strong opposition in some quarters. The price in this city has kept steady; we quote Flooring Iron, 180 francs; Merchant, 180; large Plates, 220: Sheets for building, 235, and ditto for boilers, 200 ℔ ton. Meanwhile the contracts with the three leading railroad companies on behalf of the Government are as good as signed: as soon as they are, they will be submitted to the Chambers. It is hoped that the general Iron situation will be benefited by the consummation of these plans. We should not like to be too sanguine of an amelioration, for our market is flat, notwithstanding the fact that the output of Iron in France has been reduced on an average something like 20 %. Some people think that some clauses in our treaties of commerce unfavorably affect the French iron trade and industry. This relates more particularly to Belgian and German competition in our Algerian trade. *Coal.*—Inactive, but sustained.

BELGIUM.

(Moniteur Industriel.)

BRUSSELS, May 21, 1883.—*Iron.*—The long expected revival in the Iron trade in Belgium does not yet show itself. Outside of the usual current local demand, orders are scarce. Some commands have been received, it is true, for Structural Iron, but they do not amount to much and their effect is not felt. Meanwhile rolling mills are moderately active. The situation is such that the slightest impulse given to the general demand for Iron in Belgium would no doubt start the revival looked for. Government adjudications to furnish the railroads of the State with freight cars considerable in numbers are awaited with impatience; they are likely to come off toward the close of the month. There is some talk, too, of the Government standing in need of a round lot of locomotives. Meanwhile, prices have fluctuated but little. English Pig Iron is held at 5.85 francs ℔ 100 kg.; Charleroi Foundry at 7.25; Luxembourg do., 6.25. If English Pig remains where it is, the latter two will have to come down. Puddling Pig has given way 25 cents during the past fortnight, and is at present 5 @ 6 francs. The Athus-Halanzy group keeps steady at 5 @ 5.75. This partial decline noticeable in Pig does not influence the price of rolling-mill products. If the latter were to follow Pig, they would not be better off than before; even at slightly lower Pig prices they make no money. Hence, No. 1 Merchant Iron as a general thing brings 13 francs; No. 2, 13.75, and No. 3, 14.50. Beams are weak at 13.50, and Corners at 14. The revival, should it come, would probably benefit the last-named species of Iron sooner than any other. In consequence of a slightly improved inquiry, Sheet Iron has remained steady at 17.50 @ 25 as a range. *Metals.*—The Vieille Montagne Zinc Co. has declared the same dividend it declared the previous year, of 12 francs per tenth share. The company sold last year 51,995 tons, but produced only 48,861 tons. *Coal* has remained active and firm at last week's quotations.

GERMANY.

(Borsenhalle.)

HAMBURG, May 22, 1883.—*Iron.*—The general Iron situation in Germany has undergone little change during the week. There is not much demand for Pig Iron: hence the price reduction made by the syndicate of blast-furnace owners has not led to much business. On the other hand, rolling mill products are wanted in large amounts; this procures the owners of mills a steady run of orders. Steel works, too, are quite busy. Finished Iron is thus in good position, and so is Steel, but nobody expects any improvement in price on that account. After some debate the Breslau agreement to restrict the output of Finished Iron in Upper Silesia has been renewed. From Dusseldorf we are informed that Pig Iron remains quiet, as heretofore, but that there has been no increase of stock at the blast furnaces. Greater animation is reported from there in some branches of rolling-mill products, but no improvement in prices therein is as yet perceptible. They quote as follows, ℔ ton, in marks: Prime Spiegel, 72; Gray Pig, No. 1, 62; Luxembourg ditto, 44 @ 46; Charcoal Pig, 82 @ 85; Foundry No. 1, 75; No. 2, 71, and No 3, 62; "Mudela" Spanish Foundry Pig at Ruhrort, duty paid, 80 @ 82; English No. 3 at Ruhroot, 61 @ 62; English Bessemer at port of shipment, 51 @ 52; Spanish Bessemer. "Mudela" brand, cost, freight and insurance for Rotterdam, 62/ @ 63/; German Bessemer, 61 @ 62 marks. Common Rod Iron, 132; fine ditto, 152; Common Sheets, 190 @ 200; Boiler ditto, 205 @ 215; thin ditto, 170 @ 180, and Rolled Wire for Wire Nails, 136 @ 140. *Metals* have been moderately active at ensuing quotations: German Lead, 13.50 @ 14 marks ℔ 50 kg.; Copper at 71 @ 80; Spelter at 15.50 @ 15.75, and Tin at 104 @ 107. *Coal* has continued tending upward; on the other hand, Coke has further declined.

HOLLAND.

(Koch & Vlierboom.)

ROTTERDAM, May 19, 1883.—*Tin.*—Our market has continued firm; the only demand there has been was for consumption, speculators abstaining from all dealing. We quote: Billiton, spot, 58.25; August delivery, 59. Banca, spot, 59.25, and deliverable from pending sale, 59.50.

AUSTRIA.

(Austrian Trade Journal.)

VIENNA, May 21, 1883.—*Iron.*—The usual dullness of the summer season makes itself felt, affecting more particularly Bar Iron. After the syndicate for the sale of the latter was dissolved the price dropped from 130 florins to 120, while in other portions of Austro-Hungary the lower figure has been current for a long time past. Notwithstanding this drop, it cannot be said that the situation of Finished Iron is bad, for most makers have a line of orders yet to be filled. Pig Iron has meanwhile remained steady, Styrian Puddling at 52 @ 54 florins, and Hungarian at 46 @ 48, both deliverable at the works. Sheet Iron has followed in the wake of Bars.

SPAIN.

(Revista Minera.)

HUELVA, May 20, 1883. *Copper.*—During the fiscal year under review, the Rio Tinto Mining Co. have had to remove something like 556,610 cubic meters of stuff to clear the works, causing a good deal of extra expense, with most of which the ore mined has been burdened. Next there was great expenditure in widening the mine and improvements, the outlay being £108,132, of which £50,196 were charged to the account of ores mined. Henceforth, the outlay for building, machinery, &c, will be very much less, so that ensuing years will show a much lighter cost of production. While in 1876 only 976 tons of Ingot Copper were made on the spot, there were turned out 9476 in 1881, and 9740 in 1882. More would have been produced but for the prolonged drought, pumping arrangements of an extensive kind having to be made enhancing the cost of production by 10%. Meanwhile, for nearly two years past the company have been engaged in constructing a large reservoir capable of holding 2,500,000 tons of water. These water works are nearly completed, so that the rain fallen has filled the tank 40% of its capacity, 1,000,000 tons of water being thus secured. A dividend of 14% has been declared. The old board of directors and supervisors has been re-elected.

CHILI.

(Weber & Co.)

VALPARAISO, April 2, 1883.—*Copper.*—Prices have been sustained in spite of a lack of readiness on the part of exporters to operate. The market closes dull. Fortnight's sales, 18,791 quintals at $18.55 ℔ quintal, equal to £34. 15/. *Nitrate* was quiet; holders yielded all the way down to $2.37½ for 95 %. During the past few days a recovery to $2.40 @ $2.42½ has taken place. Sales, 488,000 quintals. While production in the province of Tarapaca has increased instead of abating under low prices, as had been predicted, Taltal has stopped operations altogether, except one works. Natofagasta and Aguas Blancas are now to cease producing. Available ships' room, 45,000 tons. *Exchange*, 35d @ 35⅝d for 90 days London.

The following circular has been issued by the Bureau Veritas, dated May 10: "Iron and steel vessels which are divided in a sufficient number of water-tight compartments to allow the vessel to float with safety, in case of a serious leak arising in any one of the said compartments, shall henceforth be inserted in the Register Book with one of the following special marks: I, within a circle for the first division; II, within a circle for the second division; III, within a circle for the third division. To obtain this distinctive mark a maximum load-line, beyond which the vessel shall not be loaded, must be submitted for the approval of the direction; also a complete plan of the various compartments, together with the calculations of the displacement and of the longitudinal and transverse stability, supposing one of the compartments filled by the water. These documents must be submitted to the verification of the direction through the surveyor. The plans of the trimming compartments, the piping and pumping arrangements must likewise be submitted. The load-line and the distinctive mark shall be entered in the certificate and printed in the register."

The Caspian Oil District.

The railway between Tiflis, the capital of Trans Caucasia and Baku, was opened on May 1. A correspondent of the London *Daily News* passed through on the first trip. "There are many first sights in the East," he says, "which one never forgets, such as the first sight of the Pyramids, or of India, at Bombay, or of the mysterious glow which in a dark night may suddenly illumine the ocean, perhaps to vanish as quickly as it appeared, and the first sight of the Caspian, especially if near Baku, is one of them. Not that it is, like the others, marvelous or beautiful. But it is strange and startling, after many days' traveling among the silent mountains and the empty plains, to come all at once upon this big 'port' on the shore of a great sea in the heart of Asia; this Portsmouth of the Steppes, dotted white upon its amphitheater of brown hills, with forests of masts bristling along the shore, smoking steamers and while-sailed ships gliding over the smooth waters; its splendid Quay Alexander II, bordered with wharves and jetties, and great shops and warehouses, resounding with traffic wagons, and with open cabs for a ruble per day, and frequently with gentlemen in frock coats and chimney-pot hats, and ladies in the latest 'one-leg-trouser' fashion from Paris, and, most strange sight of all, its veritable 'black-country,' away to the left, the black, gray and white smoke of which hides the sky and stretches over the land for leagues—the petroleum mines of Baku. Let us visit them; in the industrial sphere, at all events, there are few, if any, sights as curious in the whole of the Continent. Half an hour's run by railway brings us into the heart of the black district, and to the place named Sarunchi, which may also be called Oleopolis, from the greasy character of its soil, to say nothing of its very heavy atmosphere. The soil oozes with the sticky, oleaginous stuff. You walk over acres after acres of what at first sight seems to be fields of asphalt, such as that with which they cover the London streets—only at Sarunchi the asphaltic-looking ground yields at every step, like soft putty, and perspires greasily at every pore.

"Some of the mines here can produce enough of it to light the whole of Asia, and the Russians are doing their utmost to beat the Americans in the markets of the Old World. Each mine or boring has its wooden shed, with black, wooden, pyramid-shaped chimney over the bore, or fountain hole, the upper end of which consists of an iron tube protruding to a distance of about five feet above the level of the ground. There are apparently hundreds of these black pyramids scattered about the undulating surface of Oleopolis, and they impart to the scene an aspect of curious, if dreary, monotony. And now one discovers the use of the vast and numerous lines of iron pipes which vein the upper surface of the ground all the way from Baku to Sarunchi, and which one would at first sight take for gas or water pipes. They carry the naphtha from the reservoirs at the mines to the refining factories. And, now that I am on the subject of pipes, I may mention that a nice little contract awaits some ironmaster in England or Belgium. The principal oilmaster in Oleopolis is asking the Russian Government for permission—which no doubt he will obtain—to lay down lines of pipes all the way from Baku, on the Caspian, to Batoum, on the Black Sea, a distance of some 460 miles. There is a touch of American grandeur in such an undertaking. This particular oilmaster, a Swiss gentleman, is proprietor of about 40 springs, which, as I was told on the spot, yield 180,000 poods, each of 38 pounds, per diem. One fountain which I passed—I do not know whether it was that gentleman's property—has been running for five years at the rate of 25,000 poods per day. The total yield of Oleopolis was calculated at 20,000,000 poods in 1878. Now, I am told, it is about 100,000,000."

The Pompier Corps.

New York, St. Louis and Chicago have adopted the German system of "pompier" companies for fire service. The pompiers are firemen specially drilled in the use of simple appliances for saving life, such as scaling ladders, ropes, &c. Each man is equipped with a waist-belt and spring clasp-hook, a long rope (light, but strong), a hatchet and a helmet, and each company of half a dozen or more men has several light ladders, made for scaling purposes. Each ladder is a single hickory pole, with rounds sticking out a few inches on either side. On the top is a long iron hook for fastening the ladder to the window sill. It is better that there should be one man to each ladder, and one ladder to each story of the house to be scaled; but, if necessary, two men, or even one man, with a single ladder, can quickly ascend to the top of the highest building.

The method is very simple, and does not require much skill. The ladder is driven through the glass of the window in the second story, and the first pompier ascends. If he is alone, he must straddle the window-sill, and, raising the ladder above him, drive its hook through the window above, and again ascend; but if he has a comrade he hooks himself to the first ladder, and then has both hands free with which to put his comrade's ladder to the third story, and so on. If necessary to avoid flames the pompier can swing himself over obliquely from window to window. When he reaches the roof he has the means of either helping people to escape or of assisting to raise fixed ladders or hose to his position on the roof. The chief advantage of the new system seems to be the speed with which the firemen are enabled to reach otherwise inaccessible places from the outside of a burning building. It does not displace any existing apparatus used for saving life or extinguishing fires, but is a very useful addition to the tools of a fire department. The wonder is that it comes into use here at such a late day.

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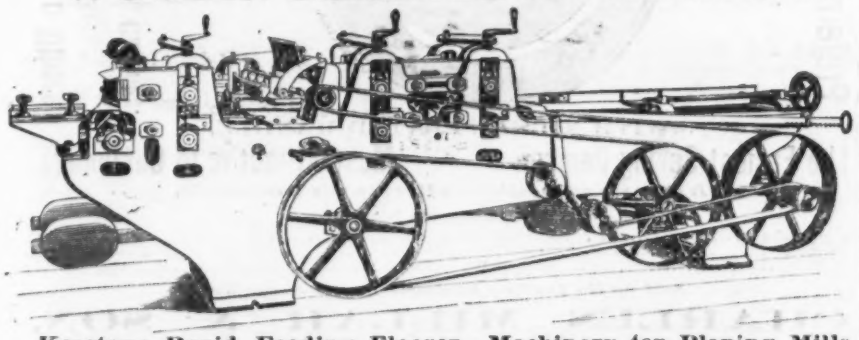

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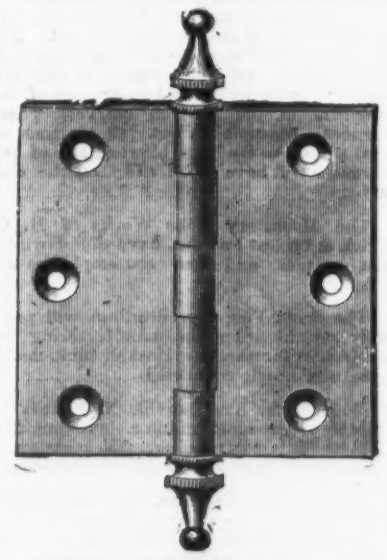

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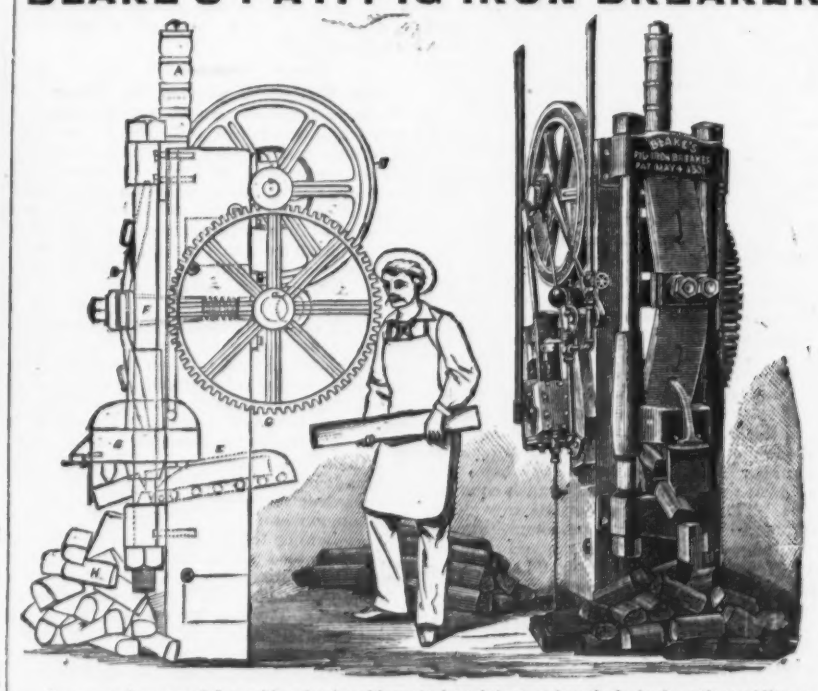

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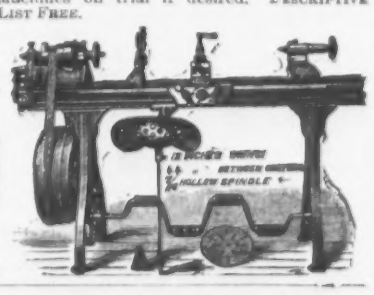

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Infernal Machines.

The Philadelphia *Press* gives what purports to be exact information as to the various styles of infernal machines. We quote as follows:

In New York City to-day, and in this city, infernal machines of every conceivable pattern are being manufactured, in many instances within a stone's throw of the headquarters of the law. Every day there go out from the ports of these two cities not less than two dozen of these machines, any of them of the power of that which caused the recent explosion in the Government buildings in London. Once in a while a machine is discovered on board a ship about to sail. The officers seize it, but the other 11 machines on the same ship they fail to find for good and sufficient reasons. The one machine was so placed that the Custom House officials could not reasonably overlook it. It was carelessly packed, thereby giving the impression that all of such machines are carelessly packed, or that they can be easily discovered. In this way the law is thrown off the scent.

The most common form of infernal machine is that known as the "ticker." To all intents and purposes it is an ordinary tin can, very like that in which astral oil is sold. The can, for such it is, is made of heavy galvanized iron, 1-16th inch in thickness. It is 1 foot high and 4 inches square. This machine, as well as all of those now made in this country, are filled with a new powder, invented by George Holgate, of Philadelphia. It has the form of ordinary gunpowder, is of a dark brown color, only explodes in connection with the simultaneous application of fire and power, and is estimated to be 200 times as powerful as giant gunpowder. The can holds, therefore, the equivalent of 900 pounds of powder. Upon one side and near the top of the can is attached, by means of brass screws, an ordinary clock-spring movement. Above this movement, and connected with it, is a small round brass wheel, about an inch in diameter, having upon one portion of the circumference a slot or notch. A spring presses upon the edge of the wheel, which revolves. When the slot is reached in the circuit, the spring falls into it with a snap, which in turn releases another spring falling upon a nipple upon which is a gun cap. The nipple is of iron, and extends down into the powder, and the explosion of the cap instantaneously sets off the compound in the bottom of the can. The machine can be set anywhere between 1 minute and 36 hours. When all is ready, the operator closes the lid, fastens it with an iron locker, and deposits it where he may desire to cause the explosion. It can be kicked, rolled around or hammered, but until the spring falls into the slot and explodes the cap there is no danger in its handling. By putting the ear close to the lid the melancholy tick-tick of the clock can be heard, but this is not noticeable at a distance of 6 feet. The machine is air-tight, and water or any like fluid has no effect on the explosive compound, even were it not hermetically sealed. It can be securely packed in a barrel of lard, a barrel of petroleum, a box of tobacco, a bag of flour, or with any of those articles of export which are not likely to attract attention. The power of such a machine depends, of course, upon the nature of the confined space in which it is placed.

The most powerful infernal machine made is what is known as an "eight-day machine." Like the "ticker" it can, however, be set from the minute upward. A machine of this description, recently made by Holgate, of Philadelphia, was 14 inches high, 6 inches square, and contained the equivalent of 3000 pounds of gunpowder. It can, however, have either a square or spherical shape. It is made of galvanized iron or stout tin. The clock movement is so arranged that it can be taken out and away from the machine and connected again at a moment's notice. The operator, if he desire to divert suspicion, carries the empty can in his hand and the clock movement in his coat-tail pocket. The explosion is caused by detonation. A sliding-bar of brass, drawn by a screw attached to the movement, when it arrives at the slot in the small brass disk, springs upon a delicate glass vial, made of a hair tube. The phial, which contains a powerful acid, and is hermetically sealed, in breaking allows the acid to escape. This causes the detonation, and the explosion follows. The wire on top of the movement, which is held in place by a rubber band, connects with the cap. The acid runs into a chlorate of potash combination. This machine can be sunk in water or secreted in any liquid or compound—in a box of oranges, a keg of nails or a loaf of bread. The force of the explosion would be sufficient to tear the largest building in the world to atoms.

A most peculiar and deadly machine is the "Little Exterminator." It is 2 inches high and 4 inches square, of thin sheet brass, nickeled on the inside and outside, and has no lid, only a minute hole in one corners The machine is filled with a volatile, the fumes of which cause instantaneous death. The principle is the same as that of the ancient Chinese "stink pot," used by them so effectively in warfare with pirates. A thin brass tube runs in through the small hole in the corner, having upon its outer end a screw cap. Upon the cap is a delicate watch movement. A spring falls into a slot and releases a minute steel spring saw, which is operated by the movement, and saws off the delicate tube. This establishes direct commmunication with the oxygen of the air, which ignites the volatile. The most sickening perfumes pour out from the box, killing every person within a radius of 100 feet. The sensation of this volatile is like that caused by Cayenne pepper. There is an intense burning in the mouth, ears and eyes and around the heart. Respiration is snatched away as if by a puff of hot air. Experiments have been made upon cats. They die in less than three seconds.

There is a large class of infernal machines known as "bottle machines." The most ordinary forms are inclosed in pint beer bottles, which can be conveniently carried in the coat pocket. The neck of the bottle is hermetically sealed with a rubber cork, through which runs a brass tube divided into two parts by a thin metallic disk, usually made of brass. The top compartment of the tube is shut off from the air by means of a screw cap, through which, in turn, runs a key. Also contained in this upper compartment is a small vial of powerful acid. By turning the key the vial is broken, and the acid falling upon the disk eats into the powder, which is packed closely. The time of explosion depends upon the thickness of the disk. The acid, the instant it comes in contact with the powder, explodes it. A large number of these machines were made for the Nihilists, to be used at the coronation of the Czar. The newest invention, and one which has met with much favor in St. Petersburg, is what is called the "hat exploder." Two exceedingly thin circular disks of sheet brass, having a layer of powder an inch thick, are soldered and riveted hermetically together, and sewn in the top of an ordinary hat. The entire weight of the machine, although it contains the equivalent of 80 pounds of powder, is only 16 ounces. The hat is waved or thrown up in the air. Falling, it explodes. The device looks for all the world like two pancakes stuck together. A great many hand grenades are made in New York. They are hollow balls of iron, through which runs a tube surmounted by a button. The button is lead. The grenade falls by force of gravity upon the side on which is the heavy lead button. The button is pressed, breaks a vial of acid and the acid causes the explosion. A grenade 3½ inches in diameter contains the equivalent of 100 pounds of powder. The eight-day machine has been made to contain Greek fire, which is set off by the clockwork, burning down the building in which it is placed. In this instance there is no explosion. It is wonderful to what extremes of ingenuity the inventors of infernal machines have gone. Machines have been and are being made in the shape of chunks of coal. They explode when thrown on the fire. Holgate has made a novel machine in the shape of a satchel. The handle connects with a vial inside, or with a spring falling into a slot. Lifting the satchel or touching the handle explodes it. Not long ago, in New York, a machine of the pancake pattern was so constructed as to be made into shoe soles. Walking on the soles for a certain time causes them to explode, and woe be unto the unfortunate possessor.

The demand for infernal machines increases constantly, and from the most unexpected quarters. There are living at New York and Philadelphia representatives of all the revolutionary societies in the world. They are not confined to Europe, but extend through Mexico and South America. A considerable number of eight-day and 30-hour machines have been made in Philadelphia, and sent to San Domingo and Hayti. A large order is now awaiting shipment into Mexico. Peru alone, of the South American countries, has used them. There were sent at one time into that country a dozen of the eight-day machines, and this within six months. Italy, Germany and Austria buy plenteously. From certain indications it would appear that some sort of a movement is speedily contemplated in Italy. An unusually large number of machines have been bought in Philadelphia to be sent to that country, and orders are coming in every day. Holgate was asked the other day what would be the effect of the explosive act now before the Pennsylvania Legislature. He said: "It will be inoperative. My machines are not infernal machines until they are made so. Anything can be made into an infernal machine—an orange, a hat, a boot, a coat, a shovel, a pound of sugar—anything, in fact. To crush the business in this way is impossible."

The Railroad System in Brazil.—The Brazilian Government, appreciating the utility and benefits of railroads in developing the country, very materially aids the several companies, not only by substantial backing, but by liberal gifts of a guaranteed interest on their capital until the roads are established on a paying basis. United States Consul Andrews, in reporting on the railroad system of Brazil, says: "The Government owns and administers several lines, and, as a rule, guarantees an income of 7 per cent. on the necessary capital invested in the construction of private roads. The number of miles of railroad owned and in operation by the Government is 800, and it also has nearly the same number of miles of railroad in course of construction, and which probably will be finished in six or eight months. The number of miles of private railroads in operation is 1600, and in course of construction, 1400. On the capital of $34,000,000 employed by the private companies owning these roads the Government has guaranteed an annual income of 7 per cent. This guarantee is not a loan, but an absolute gift, and so far the Government continues to pay the interest on the above mentioned capital. As soon as the companies begin to make sufficient earnings the Government will cease the payment of interest. Fully one-third of the railroads are through a hilly country. The greater portion of them are through a country that has long been settled, though a considerable part is yet but sparsely settled. Most of the rails with which the roads have been made were imported from England, while a part of the rolling stock was brought from the United States. The roads are almost wholly surveyed and built by Brazilian engineers."

California is having very rapid gains in population. The following table shows the increase of population since 1869:

	Arrived.	Departed.	Gain.
1869-70	26,600	18,100	8,500
1870-71	30,600	24,300	6,300
1871-72	28,700	20,700	8,000
1872-73	38,100	22,800	15,300
1873-74	52,900	26,100	25,800
1874-75	63,300	25,700	37,600
1875-76	70,309	32,800	37,500
1876-77	61,400	37,700	24,400
1877-78	42,500	29,800	12,600
1878-79	57,700	25,100	12,700
1879-80	34,700	24,700	10,000
1880-81	34,300	29,000	5,300
1881-82	54,000	33,700	20,300
1882-83	63,600	37,900	26,100
Totals	638,600	387,300	251,300

A gain of 251,300 in 14 years is certainly flattering. The opening up of a route by the Southern Pacific to immigrants from Europe will help very materially to swell the ranks of industry encouraging the immigration of skilled vine-growers, olive-growers, and those skilled in the care of the silkworm, or of the culture of the mulberry.

INDUSTRIAL ITEMS.

NEW HAMPSHIRE.

A proposition to buy the Kearsarge Mill property at Portsmouth for $100,000, and use it as the site of a large machine shop, meets with favor.

The Thurston Sewing Machine Works are to be removed from Marlborough to New Britain, Conn., the citizens of the latter place having subscribed for a liberal amount of the company's capital.

The Underhill Edge Tool Co., of Nashua, have purchased of F. S. Jacobs his interest in the manufacture of hatchets, and also the machinery used at Hingham, Mass., Mr. Jacobs entering the employ of the purchasing company as assistant superintendent.

MASSACHUSETTS.

The Fall River Iron Works will put in a new double Corliss engine of 350 horse-power, one side of which will run the puddling department and the other the plate mill. The old engine will have to be taken out and a new foundation laid. During the changes a general overhauling of the machinery in the puddling department will be made. The alterations will require some six or eight weeks.

The Bullard Arms Co., Springfield, propose to build a shop 168 x 40 feet, and four stories high, with a tower at one end. This building will give facilities for working 200 men, the company having orders enough to employ that number, and leave a space for a 120-foot addition on the other side of the tower when the business shall require it. They expect to have the building completed and ready for work in September.

A. F. Towle & Son, formerly of the Towle Mfg. Co., Newburyport, have established a business under the name of A. F. Towle & Son, for the manufacture of silver and silver-plated ware. They have recently erected a new factory 90 x 35 feet, two stories and basement, and L 31 x 40 feet, two stories. The shop will be furnished with an entire new outfit of the most improved machinery. With over 40 years' experience in this business, they fully understand the wants of the jewelry trade, to which they sell exclusively.

CONNECTICUT.

Work upon the foundations of the Southington Britannia Co.'s works, and those of the Friction Match Co., at Southington, has commenced.

The furnace at East Canaan, which was blown out for repairs, is in again.

The glass works of Morse & Gardiner, in Wallingford, Conn., were burned early on the morning of the 20th of May. Loss about $25,000, fully insured. The fire is thought to be the work of incendiaries, owing to the series of labor troubles. Nearly 50 persons are thrown out of employment.

PENNSYLVANIA.

A dispatch from Reading is as follows: "Thirty-five furnaces have been blown out along the line of the Reading Railroad. The same state of affairs prevails in all this part of the State. Of 140 furnaces in this district, 50 have been closed on account of the condition of the pig-iron market. These furnaces consumed about 750,000 tons of coal a year, so that the blowing out of the furnaces will have a bad effect on the coal miners."

The Monastery Coke Works of H. C. Frick & Co., at Latrobe, have shut down for the summer, and their 200 employees are idle.

The Scott Foundry, Reading, will probably get the order for manufacturing the projectiles for the new Haskell multicharge gun, now nearly completed.

Work at the new Danville Nail Works is rapidly progressing, and in a short time they will be ready for running. They expect to make muck bar by the middle of this month.

Maidencreek Furnace, at Lenhartsville, has blown out for repairs. A new hearth is being put into place. It will resume operations as soon as the work is completed.

OHIO.

Belfont Furnace, at Ironton, made 386½ tons of iron last week, which is her biggest work on record. The furnace is not being pushed any. She has already run over three years on the present hearth.

Work has been begun on the puddling furnaces at the Kelly Nail Mill, Ironton. One car of the machinery has been shipped, and the remainder will follow soon.

ILLINOIS.

There is being built at the Marine Engine Works one of a set of power presses for working steel while too hot to work in the dies of a hammer or roll. The machine is intended to work up to 400 atmospheres, and will take the place of a hydraulic press. It is designed by Major E. B. Meatyard, of Geneva Lake, Wis.—*Chicago Industrial World.*

O. Colborne, of Chicago, manufacturer of general machinery, has put up a 20 x 40-foot addition to his works, and has also added new machinery.

The Excelsior Iron Works are building a complete 20-ton smelting plant, consisting of Pacific water-jacket smelter, engine, blower, crusher, &c., for the Star Mining Co., of Colorado, and a 30-ton copper furnace for the Rocky Mountain Mining and Developing Co., Canon City, Col.

The Chicago Wire and Iron Works have secured the contract for about 300 feet of a special design of wrought-iron fence, to be placed in a park in that city.

MICHIGAN.

Vulcan Furnace, at Newberry, started up last week. The coal is supplied at present from 32 Mathieu retorts, which work very satisfactorily, though it is claimed that they would do much better with dry, or at least partially dry, wood. There are 56 of these retorts, 24 not yet being in operation, though ready to be filled and fired up.

Martel Furnace will be blown in on or before August 1.

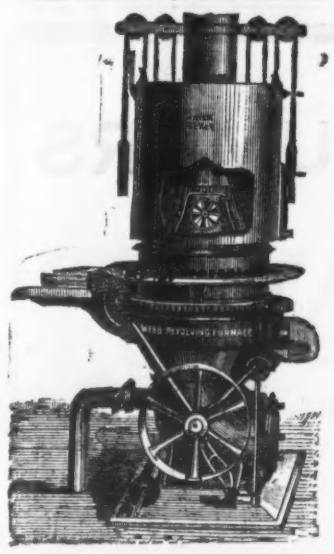
MISSOURI.

We clip the following from the St. Louis *Age of Steel*, regarding the industries of that city: The Duggan-Parker Hardware Mfg. Co. are quite busy in all their shops, and are making arrangements to begin the manufacture of bronze work. The St. Louis Wire Mill Co. have occupied their new warehouse, which is 60 x 100 feet, and has a glass roof. The St. Louis Glass Works have shut down until next September. The Globe File Works are full of work and slightly behind orders, with a prospect of falling still futher behind. J. A. Fay & Co. are making a large display of wood-working machinery at the Chicago Exposition—over five carloads.

The Helmbacher Forge and Rolling Mill Co. are working four hammers at present, one of them day and night.

CALIFORNIA.

The Pacific Iron and Nail Co., which was organized about two years ago, with a capital of $500,000, started its works on the 13th ult. The works are located at Oakland, on San Francisco Bay, and operations are at present carried on in three departments, and in as many separate buildings, namely: The rolling mill, 100 x 150 feet; the nail mill, 90 x 130 feet; and the machine and blacksmith shop, 40 x 60 feet. The rolling mill contains a blooming train and two plate trains driven by a 30 x 40 inch Corliss engine of 500 nominal horse-power. The furnaces occupy two sides of the building, the waste heat from them being utilized for the generation of the steam required for all the different engines in the mill. The nail mill, which has an engine of its own, is provided with 62 automatic self-feeding and 8 hand-feeding nail machines, arranged in two rows as close as they can stand the whole length of the building. The nail plate is made from scrap iron mixed with old rails, of which the company has 5000 tons on hand, 1500 tons of which came from Government works at Bombay, India. On nails exported, made from imported iron, the Government allows a rebate equal to the duty paid on the iron, which amounts in this case to about 40 cents per keg. The coal used is Australian Bullei, 6000 tons of which are now on hand and afloat. The nail capacity of the works is now 740 kegs a day, and when enough machines are put in to raise the total number of them to 100, as is contemplated, this capacity will be very largely increased, and the market, which consumes about 300,000 kegs per annum, will, it is thought, be kept supplied. This enormous output will be packed in kegs manufactured by the company, a large cooper shop being now in process of construction. The present officers of the company are: R. A. Wagner, president; Asa Harker, vice-president; G. T. Walker, superintendent.—*St. Louis Age of Steel.*



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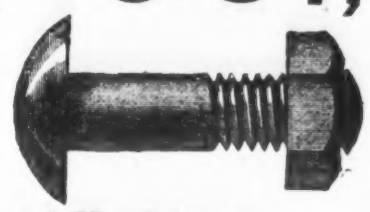

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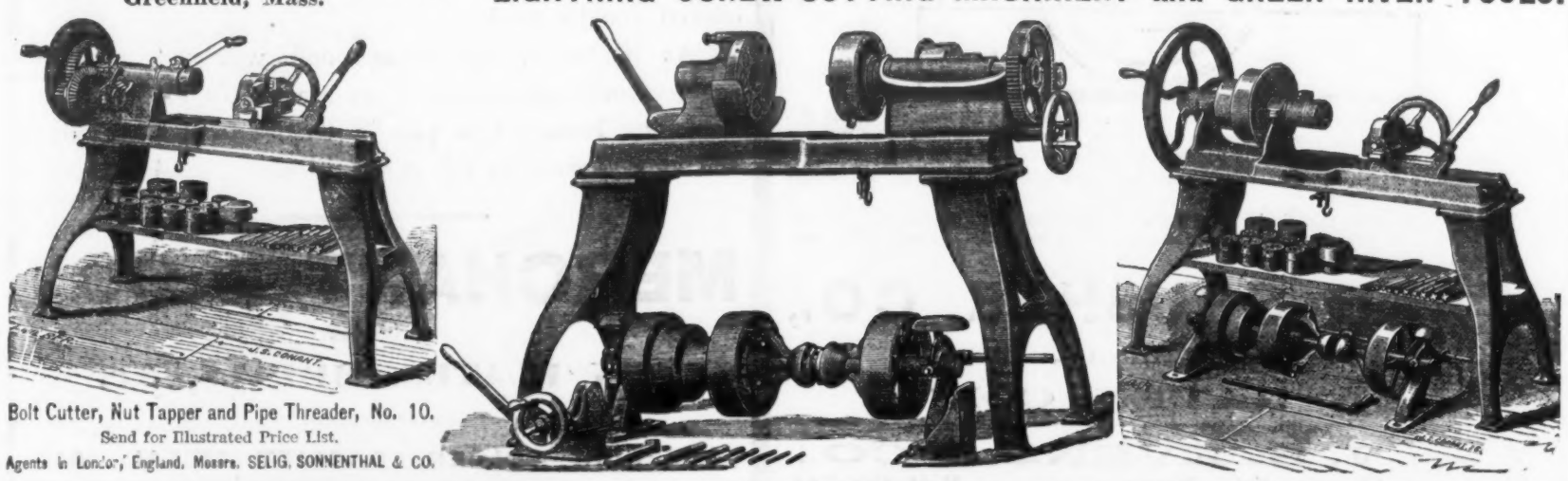

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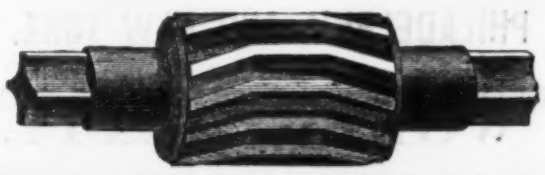

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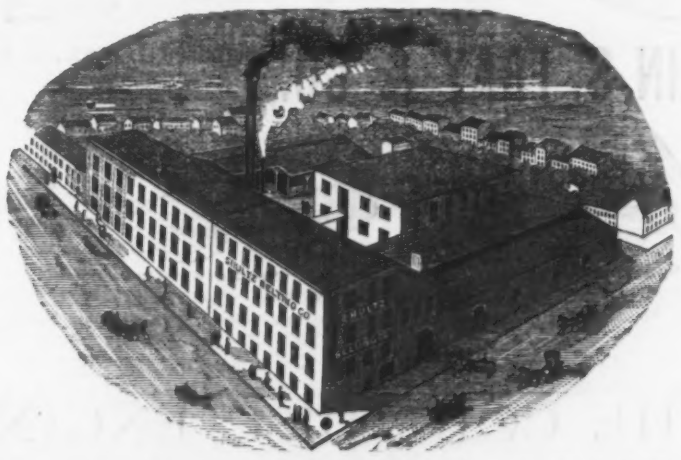

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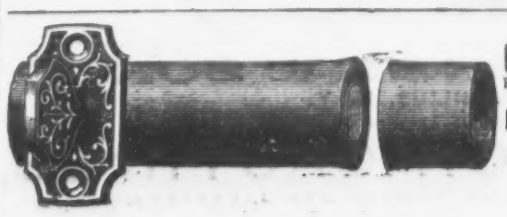

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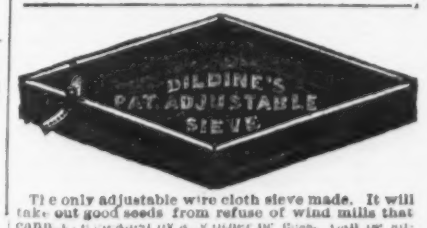

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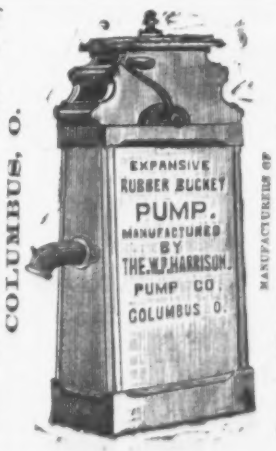

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GREATEST VARIETY OF **IRON FENCES** AND FINEST VARIETY OF

CAST AND MALLEABLE IRON CRESTING

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IRON LIFT & FORCE PUMPS

Have a few pumps that are said to be **BEST IN THE MARKET.** Let no one wishing to handle iron pumps fail to send for pump circular and prices.

THE JENKINS STANDARD PACKING is acknowledged by users as the *Best* in the world. Unlike all other Packings, the **Jenkins Standard Packing** can be made any thickness desired in a joint by placing two or as many thicknesses together as desired, and following up joint it vulcanizes in place and becomes a metal of itself (it is frequently called Jenkins Metal) and will last for years, as it does not rot or burn out. Avoid all imitations, as a good article is always subject to cheap imitations. The **genuine** has stamped on every sheet, **"Jenkins Standard Packing,"** and is for sale by the Trade generally. Manufactured only by

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GUARANTEED BEST & CHEAPEST

LARGE REDUCTION IN PRICE

HAND MOWERS 10 TO 20 IN.

HORSE MOWERS 25 TO 40 IN.

CHADBORN & COLDWELL MANUF'G CO.

NEWBURGH, N. Y.

Send for Circular & Price-List.

NEW MAKE OF MINE LAMP.

LEONARD BROS., Scranton, Pa.

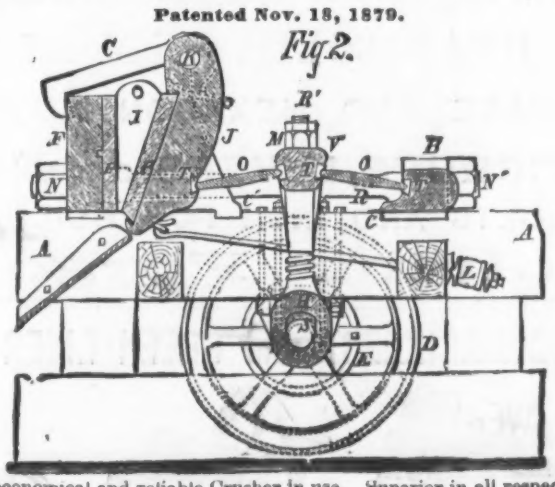
THE NEW BLAKE CRUSHER,

OR

BLAKE'S CHALLENGE ROCK BREAKER.

Patented Nov. 18, 1879.

Fig 2.



The most economical and reliable Crusher in use. Superior in all respects to our old style Blake Crushers, and rapidly superseding them and all imitations. For railway ballast, Macadam road making, and crushing of ores of all kinds it has no competitor.

This machine dispenses with cast iron frame and pitman of our old forms. All strains are on wrought iron or steel.

Awarded medals of superiority by judges of American Institute Fair, New York City, 1879 and 1880, where it was exhibited in competition with our old forms of Crusher.

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BLAKE CRUSHER CO.,

Sole Makers,

NEW HAVEN, CONN.

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Chicopee Falls, Mass. P. O. Box 224.

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GRAY IRON CASTINGS,

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Correspondence solicited.

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Owing to the importation of Private Brands, and so many of the cheapest Charcoal and Coke Bright and Roofing Plates, we would suggest, in the interest of the buyer, and fair competition among sellers, that in your asking for quotations **you insist on the Brands being mentioned,** and not permit plates to be offered you by grades.

As importers, we cannot and will not compete against grade quotations, as we are unable to know the numerous Brands now put in Grades to suit the seller and at a sacrifice to fair competition.

MERCHANT & CO.,

IMPORTERS

TIN PLATES, METALS, &c.

MANUFACTURERS

SUPERIOR SOLDER, BABBITT METAL, &c.

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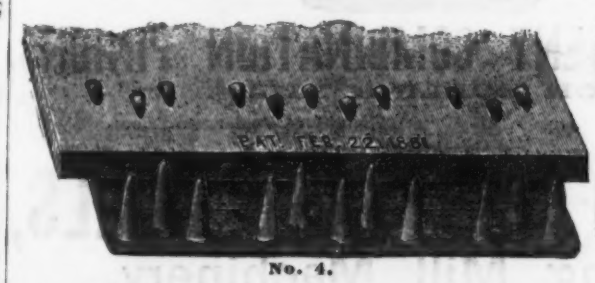

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Because there is no other Belt Fastener on earth that can hold a candle alongside of it. It is

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EASIER ADJUSTED

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Spofford Bit Brace. **Spofford Sleeve Brace.**

The Spofford Bit Brace is made under Letters Patent of the U. A., granted to N. Spofford, March 23, 1880, assigned to John S. Fray & Co.

All Iron, Five Sizes.	Cocobolo Head and Handle, Nickel Plated.	Sleeve Brace, Nickel Plated.
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NOISELESS AND ECONOMICAL.

BEST PROPELLER ENGINE *IN THE WORLD*

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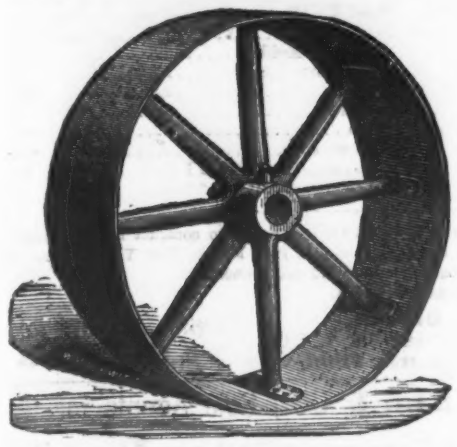

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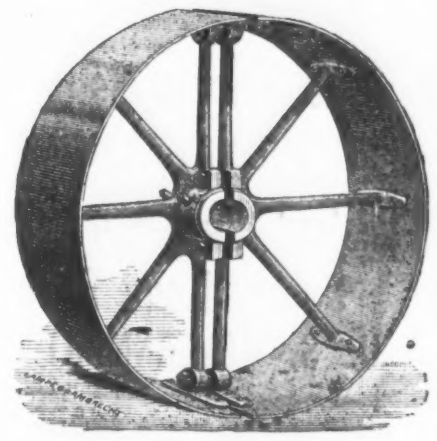
(Patented in the United States, England, France, Germany, Canada and Belgium.)



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IN THE MARKET FOUR YEARS, AND OVER 150,000 NOW IN USE.

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We, the undersigned, are using in our works a number of Medart's Patent Wrought-Rim Pulleys, and regard them GREATLY SUPERIOR to all Cast Pulleys in Lightness, Strength and Balance.

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L. Schreiber & Sons, Cincinnati, Ohio.
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Cincinnati Rolling Mills & Chain Works, Cincinnati, Ohio.
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Manual Training School, Washington University, St. Louis, Mo.
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Our Pulleys are from 40 per cent. to 60 per cent. lighter than all cast pulleys, but notwithstanding their lightness **we warrant** them for **any strain,** from the **lightest** to the **heaviest.** Whole Pulleys from 9 inches to 96 inches diameter, and Split Pulleys from 12 inches to 60 inches diameter; all widths of face up to 32 inches crowning and 36 inches straight; also tight-and-loose and double arms. Absolute satisfaction guaranteed.

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No. 1 Carries 7 feet earth.
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The Lightest and Strongest Scraper made. The body is made of one single piece of steel. *The Handles are fastened inside of fold, and free from all obstructions.* The body, bail and runners are all made of steel. Especially suited for contractors. Send for circulars. Manufactured by

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HAND FREEZER 2 to 25 qts. $1.75 to $25.00.
HAND OR POWER. 25 and 50 qts. $75.00 and $175.00
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White Mountain Freezer Co.
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Fire and Burglar Proof Also, improved ROLLING WOOD SHUTTERS of various kinds, and Patent METALLIC VENETIAN BLINDS.

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is the only shoe that will not lame an ox, which he can stand up square upon, and will prevent slipping. Six sizes. Send for circulars. Liberal discount to dealers. Manufactured by

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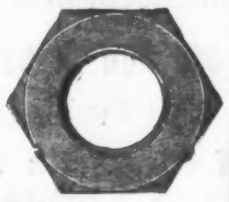

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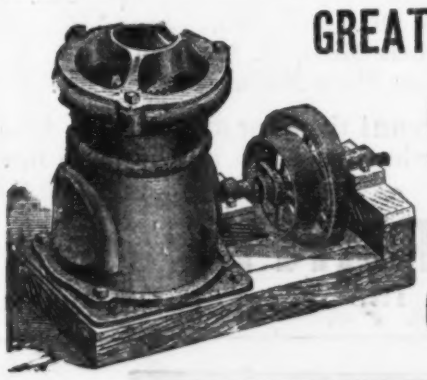

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Guaranteed to do Double the Work of any other or Money Refunded.

SEND FOR CIRCULARS.

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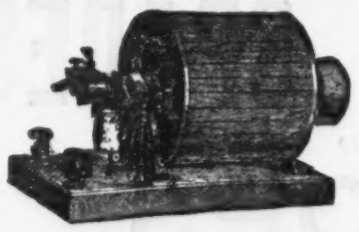
For Electro-Plating. Electrotyping, &c.

Requires no Water. Combining all the



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UNQUESTIONABLY
The Best Hanger & Rail
In the Market.

Will not break; cannot get off the track; snow, ice, or chaff cannot lodge on the Rail; will not warp or decay.

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Improved over Last Year!

OUR NEW JOINT,

With Dovetail Lap, as here shown, we guarantee to hold

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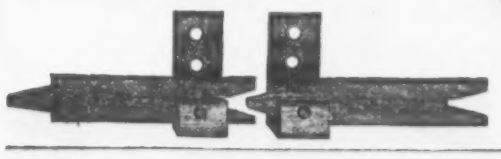

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Quality Guaranteed.

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Manufacturer and Wholesale Dealer in

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For Scythes, Axes, Knives and Turpentine Hacks

Factories at Pike Station, N. H. and Evansville & Westmore, Vt.

Genuine Old Reliable,
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The New Ross,
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Stones made, labeled and branded in any style desired. PRICE and QUALITY GUARANTEED. All the above brands are of clear, keen grit, and will not glaze.

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THEALL MINES. McCOLLUM MINES.

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AVERAGE ANALYSIS.

Per-oxide Iron	50.59	Silica	15.70
Protoxide Iron	23.02	Carbonic Acid	—
Protoxide Manganese	.32	Phosphoric Acid	.37
Alumina	3.27	Titanic Acid	—
Magnesia	.76	Sulphur	.58
Lime	1.65	Soda	—
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Metallic Iron ..... 53.31 %.
Metallic Manganese ..... .24.
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THE CROTON MAGNETIC IRON MINES are now ready to contract for next year's delivery of their superior **Magnetic Iron Ores,** delivered at Port Morris, New York City or on the line of New York and New England Railroad, Erie Railroad and connections.

The ores are guaranteed to yield **50 % Metallic Iron.**

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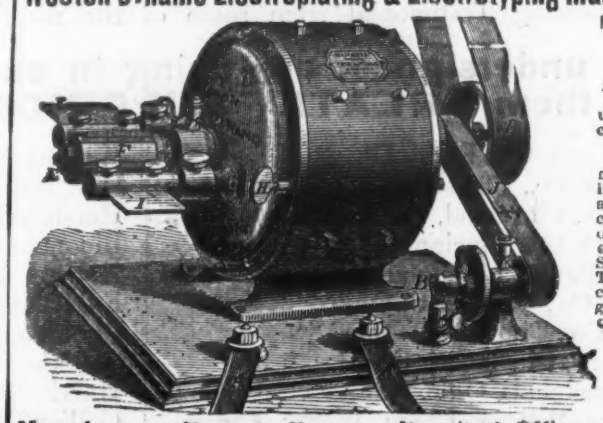
HANSON, VAN WINKLE & CO., Sole Agents for

Weston Dynamo Electroplating & Electrotyping Machines, Newark, N. J.



For Nickel, Bronze, Brass, Copper and Silver Plating.

Over 1000 machines in use.

Are used by all leading stove manufacturers.

Experienced men sent to put up machines and instruct purchasers.

INFRINGEMENTS.

We call attention to infringements of the Weston Machine in which Automatic Switches are used to prevent change of current. The Weston Co. are owners by grant or purchase of all forms of Automatic Switches for Plating Machines. The adoption of these machines will certainly lead to great loss to parties purchasing or using them.

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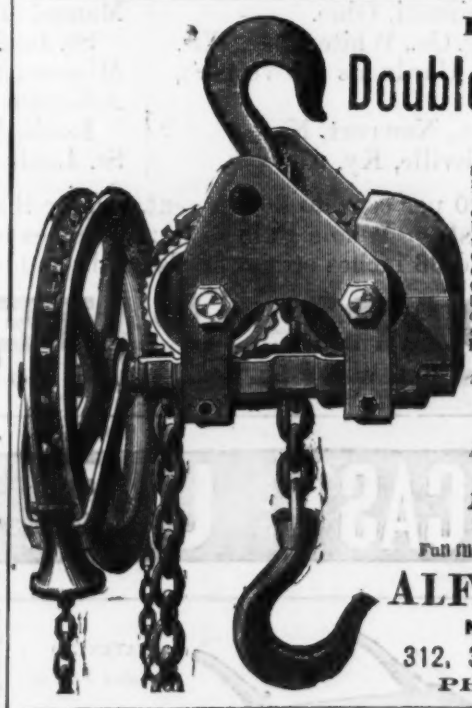
Double Screw Hoists.



The unbounded reputation these Hoists have gained for themselves the last four years has no equal. There are now over 7000 in use. Large manufacturers have duplicated their orders a dozen times over. They are in use by all city departments, railroad companies, the United States Government, the English Government, the French Government, the Chinese Government, and in Russia, Germany, Chili, Brazil, Venezuela and Cuba. They have been awarded three silver medals and five diplomas. One trial will convince you they are the best in every particular. Sizes, 500 lbs. to 40,000.

Superior Hand and Power Traveling Cranes, from 1 to 40 tons.

Elevators for Heavy Work, 1 to 10 tons capacity.

Radial Drills of the Most Improved Kind.

Full Illustrated Circulars on application.

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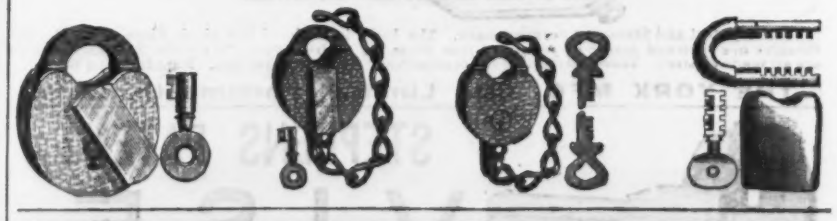
BRASS, MALL. IRON AND SCANDINAVIAN

PADLOCKS,

Manufactured by JOHN J. TOWER, 96 Chambers st., New York.

BEST QUALITY. LARGE VARIETY.

Railroad and other Padlocks made to order.



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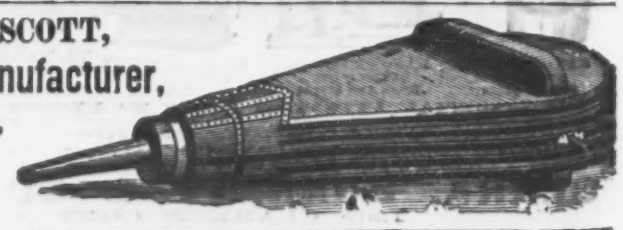

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and Index to Advertisements.

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P. & F. Corbin, New Britain, Ct.
Stanley Works, New Britain, Ct.
Landers, Frary & Clark, New Britain, Ct.
Eaton, Cole & Burnham Co., Bridgeport, Ct.
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Bradley & Hubbard Mfg. Co., Meriden, Ct.
Charles Parker Co., Meriden, Ct.
Washburn & Moen Mfg. Co., Worcester, Mass.
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Peck, Stow & Wilcox Co., Southington, Ct., and Cleveland, Ohio.
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Livingston & Co., Pittsburgh, Pa.
James Smart Mfg. Co., Brockville, Canada.
Burrows, Stewart & Milne, Hamilton, Canada.
R. M. Wanzer & Co., Hamilton, Can.
Buffalo Hardware Co., Buffalo, N. Y.
Sidney Shepard & Co., Buffalo, N. Y.
Enterprise Mfg. Co., Philadelp'a, Pa.
E. & T. Fairbanks & Co., St. Johnsbury, Vt.
Buffalo Scale Co., Buffalo, N. Y.
Jos. Barnhurst, Philadelphia, Pa.
Van Wagoner & Williams, New York, and many others.

PHILADELPHIA SCREW CO., Limited

Twelfth and Buttonwood Sts., PHILADELPHIA,

MANUFACTURERS OF

IRON AND BRASS WOOD SCREWS

OF EVERY DESCRIPTION.

Quality, finish and tests as to strength guaranteed equal to any in the market.

Desiring to give the fullest advantage to our customers, we have withdrawn all our accounts from Commission Houses, and solicit direct correspondence from Dealers in all parts of the country.

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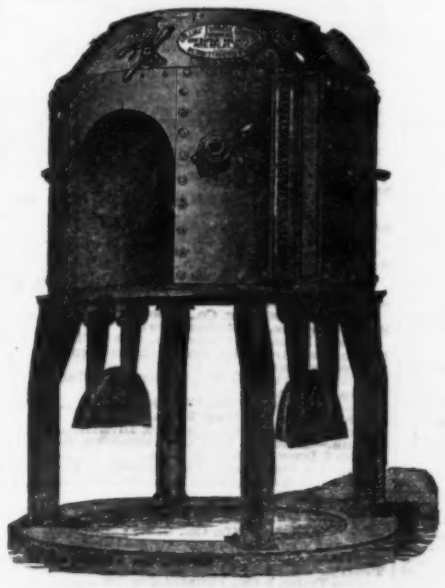
A FULL LINE IN STOCK.



Colliau Patent Cupolas.

The Advantages of the Colliau Improvements are:

1. A saving of from 20 to 50 per cent. of fuel by securing more perfect combustion at the melting point.
2. The iron is improved by the melting and a pure uniform metal is obtained.
3. Much greater rapidity of fusion, often doubling the ordinary cupola capacity.
4. Hot fluid iron all through the heat.
5. The cupola can be worked by unskilled workmen if instructions are followed.
6. Concentration of the fires in the smallest possible compass. The metal in fusion has less space to traverse while exposed to the oxydizing influence of the blast. This insures tougher castings and less waste by oxidation in the furnace.
7. The improvements can be applied to ordinary cupolas in a few days and without difficulty.
8. By this process the cupola does not clog. Melting is practically continuous as long as desired—100 tons of iron have been melted in one 58-inch cupola in six and one-half hours, and the cupola remained in perfect condition to the end.
9. A perfect "chilling iron" can be relied on when desired.
10. In the practical use of this cupola there is no fire to be seen at the loading doors, and no throwing off of combustible gases, carbonic acid gas alone escaping, the top of the cupola being as cool as if there was no fire below.

As a result of these improvements, it is claimed that the work of the Colliau cupolas has never been equaled in the quantity of metal melted in a given time, in the quantity melted in a given size of cupola, in economy of fuel used to the ton of iron in melting, in the ease and certainty of melting, in continuous melting as long as desired, in giving perfect castings to the end, in freedom from clogging or "hanging."

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Foot of Mt. Elliott Ave., DETROIT, MICH.

Imperial Club Skate.

The CHEAPEST, most RELIABLE, DURABLE and CONVENIENT Self-Adjusting Skate Ever Made.

Can be Changed to Boots varying in Size INSTANTLY by a Simple Movement of the Latch.

No WRENCHES, KEYS, SCREWS or NUTS to be Lost.
This Skate is entirely ORIGINAL in Detail and Combination.

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Sole Agents for the United States,
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THE "SIMONDS" SAWS,

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Planer Knives, Paper-Cutting Knives, Shingle, Stave and Jointer Knives, and Every description of Pattern Knives,
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Communications or orders for Saws, for Knives, or for Repairing will receive proper attention if addressed to

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Or, Corner Canal and Washington Sts., Chicago, Ill.

Jarecki's Screw Plate and Pipe Cutter.

☞ WRITE FOR DISCOUNT AND DESCRIPTION.

No. 1	Cuts off and Threads	⅛, ¼, ⅜, ½, ¾	$14.00
No. 2	" "	⅛, ¼, ⅜, 1, 1¼	16.00
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No. 3½	" "	⅛, ¼, 1, 1¼, 1½, 2	22.50
No. 4	" "	1½, 2, 2½, 3	35.00
No. 4a	" "	2½, 3, 3½, 4	50.00
No. 5	" "	4½, 5, 6	75.00

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MANUFACTURERS OF

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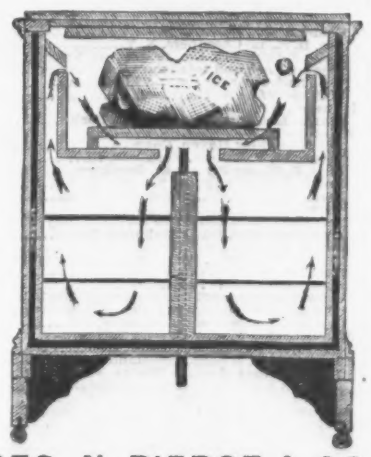

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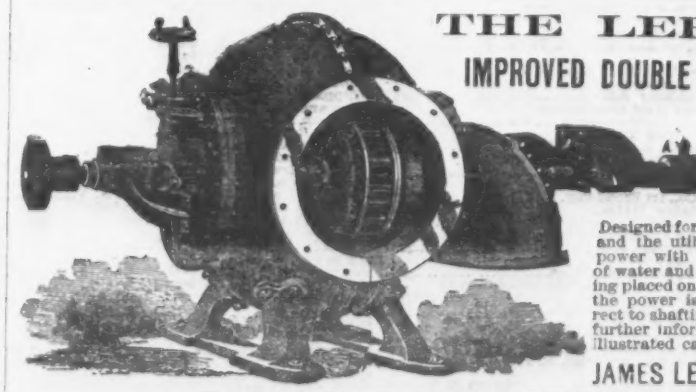

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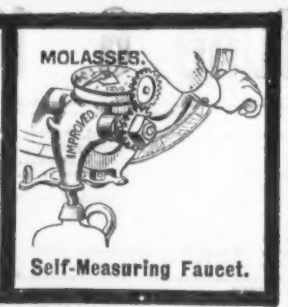

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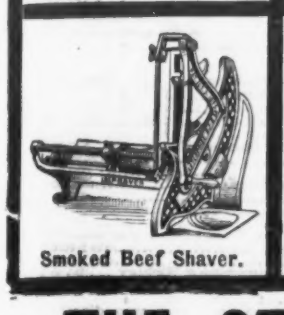
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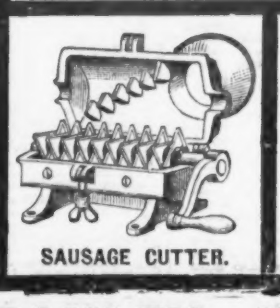
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These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, case-hardened throughout, and not only combine all of the superior qualities of our Cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench thus making a combination which has no equal.

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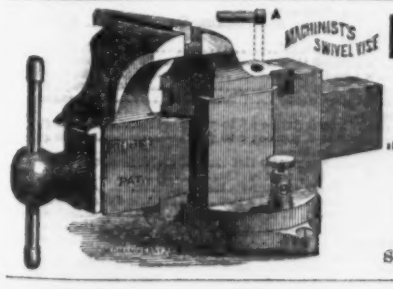

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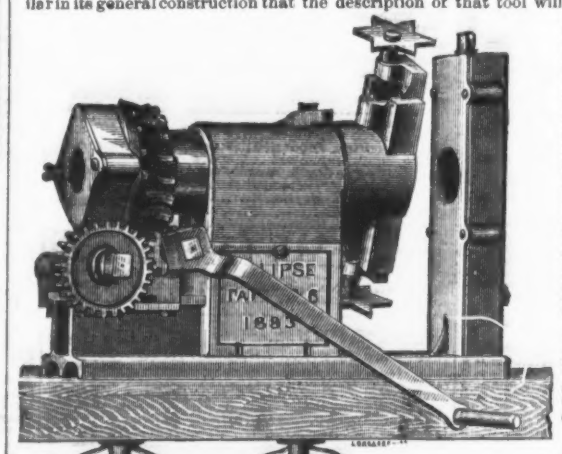
This Tool possesses all the advantages of the larger size "Eclipse" Machine, and is so similar in its general construction that the description of that tool will serve for the "Junior" also. It meets the requirements of those who have use for a Screwing Machine light enough to be readily carried about, sufficiently powerful in its gearing (18 to 1) to work easily, and strong enough to bear rough usage. All of these points, with the very important one of MODERATE COST, are to be found in the **"Junior" Eclipse Machine.**



It will cut off and thread Pipes from ⅛ to 2-inch, inclusive; can be erected on any fence, box or plank in five minutes by simply boring two ⅜ holes, and weighs, complete, about 125 pounds. It has no complicated parts and nothing to break or get out of order, and will do the work of a tool costing twice its price.

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Realizes Perfect Utilization of Coal as Fuel,

PRODUCES INGOT IRON FREE OF CARBON and INGOT STEEL OF ALL GRADES OF CARBON,

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Manufactured by

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(Centennial Award.)

"Superior in Every Respect."

This is one of the **best selling Locks** in the market and affords the dealer a large profit. It is thoroughly and strongly made—of the best material—very handsome in appearance, and every Lock is warranted. Orders solicited. Address as above

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PERFECTION WINDOW CLEANER.

Simple, Useful & Durable.

Saves 75 per cent. in time and labor over any other method.

This is the only perfect Glass and Window Cleaner yet devised. It has

TWO RUBBER STRIPS,

One an elastic cleaning edge, the other a yielding cushion or support. Has hollow iron handles to attach to pole.

We own all the Patents

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Buy only the PERFECTION,

and you escape all infringements. See that our stamp and dates of patents are on every cleaner.

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Circulars give full instructions.

Grindstones, Emery, &c.

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GRINDSTONES

Of All Kinds.

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HARDWARE.

Anvils.
Eagle Anvils American......℘ lb 10c—dis 20 %
Wright's......11c @ 11½c
Armitage's Mouse Hole......9½c @ 9¾c
Armitage's Mouse Hole (extra quality)......11½
Trenton......10½c
Wilkinson's......10½c

Anvil Vise and Drill.
Millers Falls Co., $18.00......dis 20 %
Cheney Anvil and Vise......dis 33⅓ %

Augers and Bits.
Conn. Valley Mfg. Co.
Douglass Mfg. Co.
C. E. Jennings & Co.
Humphreysville Mfg. Co.
Ives
Beecher (French, Swift & Co.)
Griswold
Nobles Mfg. Co
Snell Mfg. } dis 45&10 % from list of Jan. 7, 1880.
Watrous & Co. Extension Lip......dis 35 %
Cook's Douglass Mfg. Co......dis 40&10 %
Patent Solid Head......dis 30 %
Lewis' Patent Single Twist......dis 45 %
Russell Jennings' Auger, Dowel, Machine-Dowel and Hand Rail bits......dis 10&10&10 %
Russell Jennings' Augers......dis 16⅔&10&10&10 %
Russell Jennings' Car and Machine Bits, Boring-Machine and Millwrights' Augers......dis 25&10&10&10 %
Imitation Jennings' Bits......dis 50 %
Ives' "Jennings" Bits......dis 40&10 %
Snell Mfg. Co.'s Jennings' Bits......dis 40 %
Expansive Bits, Clark's, small, $18; large, $26..dis 25 %
Expansive Bits, Ives'......$20 @ $30—dis 33⅓&10 %
Expansive Bits, Blake's......$20—dis 40 %
Expansive Bits, Derby, $17 and $26......dis 40 %
Hollow Augers, Ives
Hollow Augers, French, Swift & Co. } dis 25 %
Hollow Augers, Douglass'......25 %
Hollow Augers, Bonney's Adjust. ℘ dz. $48—dis 25&10 %
Hollow Augers, Stearns' Adjust. ℘ dz. $48—dis 20&10 %
Hollow Augers, Ives' Expansive, each $4.50—dis 30&10 %
Hollow Augers, Universal Expan., each $4.50—dis 20 %
Wood's......dis 25 %
Gimlet Bits......$7.50 ℘ gross, dis 50 %
Gimlet Bits, Diamond......℘ doz. $1.10, dis 25&10 %
Gimlet Bits "Bee"......dis 25 %
Double Cut Gimlet Bits, Shepardson's......dis 40 %
Double Cut Gimlet Bits, Ct. Valley Mfg. Co. dis 30&10 %
Double Cut Gimlet Bits, Hartwell's......dis 60 %
Double Cut Gimlet Bits, Douglass'......dis 40 %
Double Cut Gimlet Bits, Ives'......dis 50 %
Morse's Bit Stock Drill......dis 25&10 %
Holtz Bit Stock Drills......dis 25&10 %
L'Hommedieu's Ship Augers......dis 15 %

Awl Hafts.
Sewing, Brass Ferrule......$3.50 ℘ gross—dis 40&10 %
Patent Sewing, Short......$1.00 ℘ doz.—dis 40&10 %
Patent Sewing, Long......$1.20 ℘ doz.—net
Patent Peg, Plain Top......$10.00 ℘ gross—dis 40&10 %
Patent Peg, Leather Top......$12.00 ℘ gross—dis 40&10 %

Awls, Brad Sets, &c.
Awls, Sewing, Common......℘ gross $1.70—dis 25&10 %
Awls, Shouldered Peg......℘ gross $2.45—dis 25&10 %
Awls, Patent Peg......℘ gross 69c—dis 25&10 %
Awls, Shouldered Brad......℘ gross $2.70—dis 25&10 %
Awls, Handled Brad......$7.50 ℘ gross—dis 25&10 %
Awls, Handled Scratch......$7.50 ℘ gross—dis 25&10 %
Awls, Socket Scratch......$1.50 ℘ gross—dis 10&10 %
Brad Sets, Aiken's......℘ doz $12.00—dis 45&10 %
Millers Falls Adj. Tool Hdles......℘ doz $12—dis 25 %
Brad Sets, No. 42, $10.50; No. 43, $13.50......dis 70&10&5 %
Brad Sets, Stanley's Excelsior, No. 1, $9.60...dis 30&10 %
Brad Sets, Stanley's Excelsior, No. 2, $4.80...dis 30&10 %
Brad Sets, Stanley's Excelsior, No. 3, $7.80...dis 30&10 %

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Single Bit, 4½ to 5½ and under......℘ doz $8.00 net
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Double Bit, beveled......$1.00 ℘ doz advance

Axle Grease.
Frazer's......℘ lb 6c

Axles.
Standard list......dis 45 %

Balances.
Spring Balances......dis

Bells.
Hand, Light Brass......dis 65&10 @ 70 %
Hand, Extra Heavy......dis 45 %
Hand, White Metal......dis 60 %
Hand, Silver Chime......dis 20&10 %
Hand, Globe (Cone's Patent)......dis 25&10 %
Gong, Abbe's......dis 20&10 %
Gong, Yankee......dis 30&10 %
Gong, Barton's......dis 30&10 %
Crank, Taylor's......dis 25&10 %
Crank, Brooks'......dis 50&10&2 %
Crank, Cone's......dis 10 %
Crank, Connel's......dis 15&10 %
Lever, Sargent's......dis 55&10 %
Lever, Taylor's Bronzed or Plated......net
Lever, Taylor's Japanned......dis 25&10 %
Lever, R. & E. M. Co.'s......dis 50&10&2 %
Lever, Reading......dis 25&10&10 %
Pull, Brook's......dis 50&10&2 %
Pull, Western......dis 25&10 %
Call......dis 25 %
Cow, Common Wrought......dis 55&10 %
Cow, Western......dis 20&10 %
Cow, Western, Sargent's list......dis 55&10 %
Cow, Kentucky "Star"......dis 20&10 %
Cow, Kentucky Sargent's list......dis 55&10 %
Cow, Dodge's Genuine Kentucky, new list—
Nos. 0 1 1½ 2 3 4 5 6 Hog
$12.00 10.00 9.00 8.00 7.00 5.00 3.40 2.50 5.00 } dis 60 %
Cow, Texas "Star"......dis 40&10 %

Bellows.
Blacksmiths' Common......dis 45 %
Blacksmiths' Extra Pittsburgh Pattern......dis 20 %
Molders'......dis 25 %
Hand Bellows......dis 20 %

Belting, Rubber.
Belting and Packing Co......dis 50 %

Bit Holders.
Extension, Barber's......℘ doz $15.00—dis 40&5 %
Extension, Ives'......℘ doz $15.00—dis 40 %
Diagonal......℘ doz $24.00—dis 40 %
Angular......℘ doz $24.00—dis 40&5 %

Blind Adjusters.—Domestic..℘ doz $3.00—dis 30 %
Excelsior......℘ doz $16.00—dis 50&10&2 %

Blind Fasteners.
Mackrell's......℘ doz pairs, $1.00 dis 20&10 %
Van Sand's Screw Pattern......$9 ℘ gro. dis 10&2 %
Van Sand's Old Pattern......$9 ℘ gro. dis 10&2 %
Washburn's Old Pattern......$9 ℘ gro. net
Merriman's......new list, net
Salisbury & Austin, No. 2008......$9 per gro. net
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Blind Staples.
Bar bed, ½ in. and larger......℘ lb 11c net
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Penfield Block Co., I. R. and I. Strap'd......dis 35 %
Penfield Block Co., W. I. C. bushed......dis 35 %
Penfield Block Co., W. I. all steel roll'r......dis 20 %
Penfield Block Co., L. & I Sheaves......dis 35 %
Stanley Rule & Level Co.'s......dis 40&10 %

Bolts.
Cast Iron Barrel, Shutter, &c......dis 55&10 %
Cast Iron Chain (Sargent's list)......dis 65&10 %
Ives' Patent Door Bolts......dis 55&10 %
Wrought Barrel......dis 55&10 %
Wrought Square......dis 55&10 %
Wrought Shutter, all Iron, Stanley's list......dis 50&10 %
Wrought Shutter, Brass Knob, Stanley's list.dis 50&10 %
Wrought Shutter, Sargent's list......dis 55&10 %
Wrought Sunk Flush, Sargent's......dis 75&10 %
Wrought Sunk Flush, Stanley's......dis 40&10 %
Wrought B. K. Flush. Com'n Stanley's......dis 55&2½ %
Carriage and Tire, Common......dis 80@80&10 %
Carriage and Tire, Philadelphia, new list......dis 70 %
Carriage and Tire, Philadelphia Pattern......dis 70 %
Union Carriage......dis 70 %
R. B. & W. Carriage (old list)......dis 65 %
Tire, Am. Screw Co.'s, Phila......dis 75 %
Tire, "Bay State"......dis 85&5 %
Tire, R. B. & W., new list......dis 75&10 %
Stove—American Screw Co.'s......dis 40 %
Stove, R. B. & W......dis 40 %
Stove, R. & E. Mfg. Co......dis 40 %
Plow......dis 50 %
Plow, R. B. & Co......dis 40 %
Machine......dis 65&10 %
Bolt Ends......dis 60&10 %

Borax.......16c ℘ lb net

Boring Machines. Upright Angular
First quality, no Augers......$5.50 $6.75..dis 45@50 %
Philips, with Augers......7.00 7.50......net
Jennings & Co., no Augers......5.50 6.75......dis 40 %

Boxes.
Interchangeable Shelf Boxes......dis 20 %

Braces.
Q. S. Backus......dis 50@60 %
Wilson Mfg. Co......dis 10 %
Barber's......dis 40&5 %
Spofford's Patent......dis 50&5 %
Ives' Patent Braces......dis 55@55&5 %
Common Ball (American)......dis 55 %
Amidon's......dis 50 %
Barker's Imp'd......dis 20 %
Empire......dis 30 %
Buffalo Ball......dis 40 %

Brackets.
Shelf, plain......dis 50&10 %
Shelf, fancy......dis 60&10 %
Reading, Plain......dis 65&10 %
Reading, Rosette......dis 60&10 %

Bright Wire Goods list of Dec. 15, '79..dis 55&10 %

Bull Rings.
Union Nut Co......dis 55 %
Sargent's......dis 66⅔&10 %
Hotchkiss' low list......dis 15 %
Humason, Beckley & Co.'s......dis 66⅔&10 %
Peck, Stow & W. Co.'s......dis 33⅓ & 10 %

Butts.
Wrought Brass......dis 65&10&5 %
Cast Brass, Tiebout's......dis 33⅓ %
Cast Brass, Corbin's Fast Joint......dis 20&10 %
Cast Brass, Loose Joint......dis 10&10 %
Fast Joint, Narrow......dis 45&10 %
Fast Joint, Broad......dis 45&10 %
Loose Joint......dis 55&10 %
Loose Joint, Japanned......dis 55&10 %
Loose Joint, Japanned with Acorns......dis 55&10 %
Parliament Butts......dis 55&10 %
Mayer's Hinges......dis 60&10 %
Loose Pin, no Acorn......dis 50&10 %
Loose Pin, Acorns......dis 50&10 %
Loose Pin, Acorns, Japanned......dis 60&10 %
Loose Pin, Acorns, Japanned, Plated Tips..dis 60&10 %
WROUGHT IRON.
Fast Joint, Narrow......dis 50&10 %
Fast Joint, Lt. Narrow......dis 50&10 %
Fast Joint, Broad......dis 50&10 %
Loose Joint, Broad......dis 55&10 %
Table Butts, Back Flaps, &c......dis 50&10 %
Inside Blind Regular......dis 50&10 %
Inside Blind, Light......dis 50&10 %
Loose Pin, Wrt......dis 55&10 %
Loose Pin, Light......dis 50&10 %
Spring Hinges:
Geer's Spring and Blank Butts......dis 33⅓ %
Sabin Mfg. Co.'s Double Acting......dis 35 %
Union Spiral Spring, Japanned......dis 25 %
Union Spring Hinge Co.'s......dis 25 %
American Spring Hinge Co.'s......dis 30 %
Gem Spring Hinges......dis 30 %
Barker's Double Acting......dis 20 %
Union Mfg. Co......dis 25 %
Bommer's......dis 25 %
Buckman's......dis 25 %
Empire......dis 50&10 %
Acme......dis 65&10 %
Climax......dis 50&10 %
Blind Butts Parker......dis 70&2 %
Blind Butts, Palmer......dis 45&10 %
Blind Butts, Seymour......dis 70 %
Blind Butts, Shepard's "Double Locking," Nos. 1 & 2......dis 70 %
Shepard's Standard, Nos. 4 and 5......dis 70 %
Blind Butts, Lull & Porter......dis 70&10 %
Blind Butts, Nicholson......dis 45&10 %
Blind Butts, Huffer......dis 50 %
Blind Butts, Clark's, Nos. 1, 3, 5......dis 70&2 %
Blind Butts, Sargent's, Nos. 1, 3......dis 50&10&10 %
Blind Butts, Sargent's, No. 12......dis 70&10 %
Blind Butts, Reading's Gravity......dis 66⅔&10 %
Clark's Improved Shutter Hinge, Nos. 0, 1, 1½, 2, 2½, 3......dis 60&10 %

Bow Pins.
Humason, Beckley & Co.'s, Nos. 1 and 2......dis 60 %
Humason, Beckley & Co.'s other Nos......dis 66⅔&10 %
Sargent & Co.'s......$19.70 and $21.40, dis 66⅔&10 %
Hotchkiss......dis 25 %
Peck, Stow & W. Co......dis 30&10 %

Butcher's Cleavers.
Humason & Beckley Mfg. Co......dis 25 %
Bradley's......dis 25 %
Beatty's......dis 25&5 %
1 2 3 4 5 6 7 8
$16.50 19.00 21.40 24.00 27.00 30.00 33.50 36.50

Can Openers.
Messenger's Comet......℘ doz $3.00, dis 25
American......℘ gross $6.00, dis 25 %
Duplex......℘ doz 25c, dis 15@20 %
Lyman's......℘ doz $3.75, dis 20 %
No. 4, French......℘ doz $2.25, dis 55 %
No. 5, Iron Handle......℘ gross $9.00, dis 25 %
Eureka......℘ doz $2.50, dis 10 %
Sardine Scissors......℘ doz $7.00, dis 55 %
Star......℘ doz $5.00, dis 25&5 %
Sprague, No. 1, $2.00; No. 2, $2.25; No. 3, $2.50......dis 50&10 %
"Worlds Best" ℘ gross, No. 1, $12.00; No. 2, $24.00; No. 3, $36.00......dis 50 & 10 %
Universal......℘ doz $3.00, dis 35 %
Domestic......℘ doz $2.50, dis 45 %
Champion......℘ doz $2.00, dis 50 %

Caps—Percussion, ℘ 1000.
Hicks & Goldmark's
F. L. Waterproof, 1-10's......50c
E. B. Trimmed Edge, 1-10's......64c
E. B. Ground Tr'md Edge, Central Fire, 1-10's..70c
Pistol Waterproof, extra heavy, 1-10's......$1.40
Musket Caps, 1-10's......80c } dis 10&10
U. M. C., F. C. trimmed......50c
U. M. C., F. L. ground......70c } dis 10&10 %
U. M. C., Cen. fire ground......70c
U. M. C., Double W. Proof......$1.40 } dis 10&5 %
G. D. & S. B......33c, dis 10 %
Double Waterproof, in 1-10's......$1.40
Colt's Pistol, in 1-10's......75c } dis 10 %
F. L......50c
E. B. 1-10, trimmed......65c
E. B. 1-10, ground edge......70c } dis 10&5 %
Musket, in 1-10's......80c, dis 25 %

Cartridges.—Rim......dis 75
Central Fire......dis 20&10 %

Cards.—Horse and Curry.new list, July, '81, dis 10 %
Cotton......new list, July, '81, dis 10 %
Wool......new list, July, '81, dis 10 %

Carpet Stretchers.
Cast Steel, Polished......℘ doz $5.00, dis 20 %
Cast Iron, Steel Points......℘ doz $2.00, dis 50&5 %
Socket......℘ doz $2.50, dis 25 %
Bullard's......dis 25 %

Casters.—Bed......dis 45@50 %
Plate......45@50 %
Shallow Socket......dis 35&10 %
Deep Socket......dis 25&10 %
Martin's Patent (Phoenix)......dis 25 %

Cattle Leaders.
Humason, Beckley & Co.'s......dis 70&10 %
Sargent's......dis 70&10 %
Hotchkiss......dis 25 %
Peck, Stow & W. Co......dis 33⅓&10 %

Chain.
Trace, 6½-10-2......℘ pair 79c
Trace, 6½-10-3......℘ pair 70c
Trace, 7-10-2......℘ pair 86c } dis 35 %
German Halter Chain, list of Dec. 31, 1881......dis 50 %
German Coil, list of Dec. 31, 1881......dis 50 %
Covert Halter, Hitching and Breast......dis 35&5 %
Oneida Halter Chain (old list)......dis 45 %
Galvanized Pump Chain......℘ lb 9½c net
Jack Chain, Iron......dis 60&10 %
Jack Chain, Brass......dis 50&10 %

Chalk.
White......℘ gross 60c net
Red......℘ gross 80c net
Blue......℘ gross $1.00 net
White Crayons......℘ gross 11c net

Chalk Lines.—See Lines

Chisels.
Socket Framing, Crossman......dis 65&5 %
Socket Framing, Arlington Edge Tool Co...dis 65&10 %
Socket Framing, Buck Bros......1876 list, dis 22½ %
Socket Framing, Merrill......dis 65&10 %
Socket Framing, Witherby Tool Co......dis 65&10 %
Socket Framing, Douglass'......dis 65&10 %
Socket Firmers, Crossman......dis 65&5 %
Socket Firmers, Arlington Edge Tool Co....dis 65&10 %
Socket Firmers, Buck Bros......1876 list, dis 22½ %
Socket Firmers, Merrill......dis 65&10 %
Socket Firmers, Witherby Tool Co......dis 65&10 %
Socket Firmers, Douglass'......dis 65&10 %
Socket Corner......dis 65&10 %
Tanged Firmers......dis 40@45 %
Tanged Firmers, Butcher's......$5.00@$5.25 to £
Tanged Firmers, Spear & Jackson's......5.00 to £
Tanged Firmers, Buck Bros (Shank)......5.25 to £
Globe Mfg. Co......dis 65&10 %

Clamps.
Iron, Providence Tool Co.'s Wrt. Iron......dis 25 %
Iron, Adjustable, Gray's......dis 20 %
Iron, Adjustable, Lambert's......dis 20 %
Iron, Adjustable, Snow's......dis 40&5 %
Iron, Adjustable, Hammer's......dis 15 %
Iron, Adjustable, Stearns'......dis 20&10 %
Iron, Cabinet, Sargent's......dis 70&10 %
Iron, Carriage Makers', Sargent's......dis 65&10 %

Clips, Axle.
Norway or Best......dis 60&5 %
Superior......dis 60&5 %

Cockeyes.......dis 55 %

Cocks, Brass.
Racking, new list, July 10, 1880
Globe, new list, July 10, 1880
Plain Bibbs, new list, July 10, 1880
Ale and Beer, new list, July 10, 1880 } dis......45 %

Coffee Mills.
Board and Box......dis 45 %
Wilson's......dis 45 %
Selsor's Pat......$9.50, $10.50, dis 25 %
American (Enterprise Mfg. Co.)......dis 20&10 %
The "Swift" (Lane Bros.)......dis 20&10 %
Webb's Patent......dis 45 %

Combined Dinner Pail and Lantern.
Per doz $15.00......dis 30 %

Compasses, Dividers, &c.
Compasses......dis 55 %
Calipers......dis 55 %
Dividers......dis 55 %
Bemis & Call Co.'s Dividers......dis 60&5 %
Bemis & Call Co.'s Compasses and Callipers..dis 50&5 %
Bemis & Call Co.'s Wing & inside or outside..dis 50&5 %
Bemis & Call Co.'s Double......dis 60 %
Bemis & Call Co.'s (Call's Patent Inside)......dis 30 %
Excelsior......dis 50 %
Cook's Extension......dis 25 %

Coopers' Tools.
Bradley's......dis 10 @ 20 %
Barton's......dis 20 %

Corkscrews.—Humason & Beckly Mfg. Co.dis 33⅓ %
Clough's Pat......dis 33⅓ %

Corn Knives and Cutters.—Bradley's....dis 10 %
Wadsworths......dis 25 %

Crow Bars.
Cast Steel......℘ lb 6½c
Iron, Steel Points......℘ lb 5 c

Curling Irons, &c.
⅜, ⅝, ¾ in., $1.80, 2.00, 2.40......dis 10 %
Curling Tongs......℘ doz $3.65, dis 10 %
Pinching Irons......℘ doz $7.50, dis 20 %

Curry Combs.
Fitch's......dis 50&10 %
Hotchkiss, Novelty, new list, July 1880......dis 25 %
Hotchkiss, Exclr. Supr. Champion......dis 25 %
Rubber......℘ doz $10.00, dis 25 %

Curtain Pins.
Silvered Glass......net
White Enamel......net

Cutlery.
Meriden Cutlery Co. (Table)......net
Am. Miller Bro.'s Cutlery Co......dis 25 %
Humason & Beckley, Pocket......dis 33⅓ %
Naugatuck Cutlery Co......list net
Aaron Burkinshaw's Pocket......dis 25 %

Dog Collars.
Embossed Gilt......dis 30&10 %
Leather......dis 40 %
Brass......dis 40 %

Door Springs.
Torrey's Rod, regular size, ℘ doz., $3......dis 50 %
Gray's Rod......dis 15 %
Bee Rod......dis 15 %
Warner's......dis 30 %
Gem (Coil):
No. 1, Large Japanned......℘ doz $4.00
No. 2, Medium, Japanned...℘ doz 2.75
No. 3, Small, Japanned......℘ doz 2.00 } dis 50 & 10 %
Star (Coil)—For Cop'd, Nickel-Plated &c., see list.
No. 4 ("Shoo Fly") Screen door size, ℘ doz $1.50
No. 5, Screen Door size......℘ doz 2.00
No. 6, Medium......℘ doz 2.75
No. 7, Large......℘ doz 4.00 } dis 60 %
Sabin's Lever..No. 1, $1; 2, $1.50; 3, $2; 4, $2.50..dis 35 %
Sabin's Boss. No. 1, ℘ doz. $4.00; 2 $2.75; 3, $2.dis 33⅓ %
Sabin's Crown......℘ doz $1.50, dis 33⅓ %
Philadelphia......5 in., $5.00; 8 in., $7.75, dis 35 %
Cowell's......No. 1, ℘ doz. $18.00; No. 2, $15.00, dis 50 %
Rubber, complete......℘ doz. $1.80, dis 10 %
Hercules......dis 50 %

Drawing Knives.
Arlington Edge Tool Co......dis 65&10 %
Crossman's No. 1......dis 65&5 %
Morrill......dis 65&10 %
Nobles Mfg. Co......dis 15 %
Bradley's......dis 35 %
Adjustable Handle......dis 20 %
Witherby Tool Co......dis 65&10 %
Douglass......dis 65&10 %
Globe Mfg. Co......dis 65&10 %

Drills and Drill Stocks.
Blacksmiths'......each, $2.50, dis 10 %
Blacksmiths' Self-Feeding......each, $7.50, dis 20 %
Breast, P. S. & W......dis 20&10 %
Breast, Hotchkiss'......dis 20 %
Breast, Wilson's......dis 20 %
Breast, Millers Falls......each, $3.00, dis 25 %
Breast, Bartholomew's......each, $2.50, dis 25&10 %
Ratchet, Merrill's......dis 10 %
Ratchet, Ingersoll's......dis 25 %
Ratchet, Whitney's......dis 20 %
Ratchet, Weston's......dis 20 %
Ratchet, Moore's Triple Action......dis 20&25 %
Whitney's Hand Drill, Plain, $11.00 Adjustable, $12.00......dis %
Wilson's Drill Stocks......dis 10 %
Automatic Boring Tools......each, $2.25, dis 20 %

Drill Chucks.
Morse's Beach Patent......dis 30 %
Morse's Adjustable......each, $10.00, dis 30 %
Danbury......each, $8.00, dis 30 %

Egg Beaters.
Dover......℘ doz. $2.50, dis 2 %
Monroe's......dis 40 %
National......℘ doz. $4.50, dis 33⅓ %
Standard......℘ gross, $18.00, dis 25 %
Family (T. & S. Mfg. Co.)......℘ gross, $18.00, net
Acme......℘ gross, $12.00, dis 25 %
Triumph (T. & S. Mfg. Co.)......℘ gross, $11.50, net

Elevator Buckets.
Mill E. Buckets, light, 3½ to 10 in. (Duc's Improved), ℘ 100, $15.00 @ $54.00......dis 10 %
Mill E. Buckets, heavy, 5 to 10 in. (Duc's Improved), ℘ doz. $5.60 @ $10.20......dis 10 %
Storehouse (Duc's Patent), 12 to 17, $12 @ $20....dis 10 %

Emery and Emery Paper.
Regular numbers......℘ lb 6c
Flour and F. F......℘ lb 4c
B. & A. Emery Paper......dis 30&5 %
Sibley's Emery and Crocus Cloth, large size, $10; medium, $10.50 ℘ ream......dis 15 %

Enameled and Tinned Ware.
Kettles......dis 50 %
Sauce Pans......dis 25 %
Tinned Sauce Pans......dis 25 %

Escutcheon Pins.
Brass......dis 50 %

Escutcheons.
Door Lock......Same discounts as Door Locks
Brass Thread......dis 55 %
Wood......dis 25 %

Faucets.
Fenn's......dis 40 %
Bohren's Patent Rubber Ball......dis 25 %
Fenn's Cork Stops......dis 33⅓ %
Star......dis 55&10 %
Frary's Patent Petroleum......dis 20&10 %
West's Patent Key......dis 45 %
Ancher Lock......dis 45 %
Metallic Key, Leather Lined......dis 60 %
Cork Lined......dis 70 %
J. Sommer's Best Metallic Key......dis 40&10 %
J. Sommer's Cork Lined, 1st quality......dis 50 %
Self-Measuring, Enterprise....℘ doz. $36.00, dis 20&10 %
Self-Measuring, Lane's......℘ doz. 36.00, dis 20&10 %
Self-Measuring, Victor......℘ doz. $36.00, dis 25&10 %

Felloe Plates.......℘ lb, 100, dis 25 %

Files.
J. & Riley Carr......new list April 1, '83, dis 20 %
J. & Riley Carr Horse Rasps......dis 10 %
Butcher's......
Moss & Gamble......new list, dis 15 %
H. Disston & Sons (new list)......dis 50 %
Heller Bros.' Horse Rasps......dis 35 %
Heller Bros.' Files......dis 50 %
Nicholson......dis 50 %
New American......dis 50 %
Union File Co......dis 50 %
Stubs......new list, dis 25@30 %

Fluting Machines.
Knox, 4½-inch Rolls......$3.50 each
Knox, 6-inch Rolls......$4.00 each } dis 25 %
Eagle, 3½-inch Roll......$2.15, dis 25 %
Eagle, 5½-inch Roll......2.85, dis 25 %
Crown, 4½-in., $3.50; 6-in., $4.00; 8-in., $6.50 each, dis 25 %
Crown Jewel......6-in., $3.40 each, dis 25 %
American, 5-in., $3; 6-in., $3.40; 7-in., $4.50 each, dis 25 %
Domestic Fluter......$1.50 each, net
Geneva Hand Fluter, White Metal...℘ doz $12, dis 25 %
Crown Hand Fluter, Nos. 1, $15; 2, $12.50; 3, $10.00 ℘ doz......dis 30 %
Shepard Hand Fluter, No. 85......per doz $15, dis 40 %
Shepard Hand Fluter, No. 110......per doz $8.75, dis 30 %
Shepard Hand Fluter, No. 95......per doz $6.50, dis 20 %
Clark's Hand Fluter......℘ doz $15.00, dis 33⅓ %
Combined Fluter and Sad Iron....℘ doz $15.00, dis 30 %
Buffalo......℘ doz $10.00, dis 10 %

Fluting Scissors......dis 45 %

Fly Traps.
Paragon......℘ doz, $3, net

Forks.
Hay, Manure and Spading......dis 50&10 %
Plated, A 1, Rogers & Bro......dis 40&10&5 %
Plated, Reed & Barton......dis 40&10&5 %

Fruit and Jelly Presses.
Enterprise Mfg. Co......dis 25 %

Fry Pans.
Burnished list as follows......dis 60&10&5 %
No......0 1 2 3 4 5 6 7 8
℘ doz......$3.00 3.75 4.25 4.75 5.25 6.00 7.00 8.00 9.00
"Acme"......dis 40&10 %

Gauges.
Marking Stanley's......dis 50&10 %
Marking, Chapin's......dis 55&10 %
Wire......dis 70&10 %
Wire, Disston's......dis 20 %
Wire, Wheeler, Madden & Co......dis 10 %

Gimlets.
Nail and Spike......dis 40&10 %
"Eureka" Gimlets......dis 40&10 %
"Diamond" Gimlets......dis 40&10 %
Double Cut, Shepardson's......dis 40&10 %
Double Cut, Hartwell's......dis 40&10 %
Double Cut, Ives'......dis 40&10 %
Double Cut, Douglass'......dis 40 %
"Bee"......℘ gro. $12.00, dis 25 %

Glue Pots.
Tinned and Enameled......dis 25&5 %
Family, Howe's "Eureka"......dis 25 %
Family, L. F. & C.'s "Handy"......dis 30 %

Grindstone Fixtures.
Sargents Patent......dis 70&10 %
Reading Hardware Co......dis 30&10 %

Gun Wads.
U. M. C. B. E., 11 up......$2.00
U. M. C. B. E., 9&10......2.30
U. M. C. B. E., 7&8......2.60
U. M. C. P. E., 11 up......3.10
U. M. C. P. E., 9&10......4.00
U. M. C. P. E., 7&8......4.90 } dis 5&5 %

Halters.
Covert's Pat. Rope......dis 50 %
Horse and Cattle Ties Covert's......dis 50 %

Hammers.
Maydole's......dis 15 %
Cheney's, new list, March, 1883......dis 20&5 %
Hartford Hammer Co. (new list July 1, '81)....dis 20 %
Humason & Beckley......dis 15 %
Verree......dis 5 %
Magnetic Tack, Nos. 1, 2, 3, $1.26, 1.50 and 1.75.dis 25&10 %
Nelson Tool Works......dis 40&10 %
Warner & Noble's......dis 5 %
Yerkes & Plumb......dis 15 %
Wilkinson's Smiths'......11½c ℘ lb net

Hand Cuffs and Leg Irons.
Providence Tool Co., Hand Cuffs, $15.00 ℘ doz.dis 10 %
Providence Tool Co., Leg Irons, $25.00 ℘ doz....dis 10 %
Tower's......dis 25 %

Handles.—Door or Thumb Latches.
Nos......0 1 2 3 4
Per doz....$0.80 1.00 1.18 1.35 1.60....dis 60&10 %
Roggin's Latches......℘ doz 35c. @ 40c. net
Bronze Iron Drop Latches......℘ doz $0.90 @ 1.10
Jap'd Store Door Handles—Nuts, $1.62; Plate, $1.10; no Plate, $0.88......dis 10 %
Barn Door......℘ doz $1.60, dis 10&10 %
Wrought Chest......dis 70 %
Surface Chest......dis 60&10 %
Flush Chest......dis 60&10 %
Lifting......dis 55&10 %
Saw and Plane......dis 60&10 %
Boynton's Loop Saw Handles......50c. dis 35 %
Boynton's Centennial Saw Handles......30c. dis 25 %
Hammer and Hatchet......dis 20 %
Bard Awl......℘ gross, $1.00 dis 10 & 20 %

Hickory Firmer Chisel, assorted, ℘ gross . $4.50
Hickory Firmer Chisel, large, ℘ gross...... 5.00
Apple Firmer Chisel, assorted, ℘ gross...... 5.00
Apple Firmer Chisel, large, ℘ gross...... 6.00
Socket Firmer Chisel, assorted, ℘ gross.... 3.00
Socket Framing Chisel, assorted, ℘ gross.. 5.00
File assorted, ℘ gross...... 2.75
Auger, assorted, ℘ gross...... 5.00
Auger, large, ℘ gross...... 7.00 } dis 20&10 @ 25&10
Patent Auger, Ives'......dis 25 %
Patent Auger, Douglass'......℘ set $1.25 net
Patent Auger, Swan's......℘ set $1.00 net

Hangers.
Barn Door, old patterns......dis 60&10 %
Barn Door, New England......dis 65&10 %
Climax (Anti-Friction)......dis 50 %
Challenge......dis 50 %
"Champion" Medina Mfg. Co......$15; dis 50&10 %
Sterling Improved (Anti Friction)......dis 65&10 %
Cheritree......dis 50 %
Kidder's......dis 50&5 %
U. S......4 in., $12; 5 in., $15; dis 60 %
The "Boss"......dis 50&10 %
Terry's Patent......5 in., $12; 3½ in., $10; dis 40 %

Harness Snaps.
Anchor (T. & S. Mfg. Co.)......dis 60 %
Henshaw's, list of 1½ changed to $14.00......dis 60 %
Judd's, list of 1½ changed to $14.00......dis 55&10 %
Fitch's (Bristol), list of 1½ change to $14.00...dis 55&10 %
Hotchkiss'......dis 10 %
Andrews'......dis 50 %
Sargent's......dis 70&10 %
German, low list, Sep., 1882......dis 33⅓ %
German, Sargent's new list......dis 60&10 %
Covert......dis 50 %
Covered Spring, new list, Oct., 1882......dis 60& %

Hatchets.
Isaiah Blood......dis 30 %
Shingling, Nos. 1 2 3......℘ doz $7.25 $8.00 $8.75
Claw, Nos. 1 2 3......℘ doz 7.75 8.50 9.25
Lathing, Nos. 1 2 3......℘ doz 7.50 8.00 8.50
Hunt's......dis 25 %
Shingling, Nos. 1 2 3......℘ doz $7.25 $8.00 $8.75
Claw, Nos. 1 2 3......℘ doz 7.75 8.50 9.25
Lathing, Nos. 1 2 3......℘ doz 7.30 8.25 9.00
Hurd's......dis 30 %
Shingling, Nos. 1 2 3......℘ doz $8.00 $8.50 $9.00
Claw, Nos. 1 2 3......℘ doz 9.00 9.50 10.00
Lathing, Nos. 1 2 3......℘ doz 8.00 8.50 9.00
Yerkes & Plumb......dis 30 %
Shingling, Nos. 1 2 2......℘ doz $7.50 $8.00 $8.50
Claw, Nos. 1 2 3......℘ doz 8.25 8.75 9.25
Lathing, Nos. 1 2 3......℘ doz 7.50 8.00 8.50
Simmons'......dis 30 %
Shingling, Nos. 0 1 2 3..℘ doz $7.50 $8.00 $8.50 $9.00
Claw, Nos. 0 1 2 3..℘ doz 8.50 9.00 9.50
Lathing, Nos. 0 1 2 3..℘ doz 8.00 8.50 9.00
Broad, Nos. 1 2 3 4..℘ doz 9.00 10.00 12.00 14.00
Broad, Nos. 5 6 7 8..℘ doz 16.00 18.00 20.00 22.00
Collins......dis 10
Shingling, Nos. 1 2 3......℘ doz $5.50 $6.00 $6.50
Claw, Nos. 1 2 3......℘ doz 6.00 6.50 7.00
Lathing, Nos. 1 2 3......℘ doz 5.50 6.00 6.50
Peck's Champion Blade......dis 30
Shingling, Nos. 1 2 3......℘ doz $8.00 $8.50 $9.00
Lath, Nos. 1 2 3......℘ doz 8.00 8.50 9.00
Claw, Nos. 1 2 3......℘ doz 9.00 9.50 10.00
Half, Nos. 1 2 3......℘ doz 8.00 8.50 9.00
Ax Pattern, Nos. 1 2 3......℘ doz 10.00 11.00 12.00

Hay Knives.
"Lightning"......℘ doz $20.00 dis 10 %
Wadsworth's......dis 33⅓ %

Hinges.
Gate, Western......℘ doz $4.90 dis 55 %
Gate, N. E......℘ doz $7.70, dis 55 %
Gate, N. E. Reversible......℘ doz $6.45, dis 55 %
Gate, Clark's, Nos. 1 2 3......dis 50 %
Gate, N. Y. State......℘ doz $5.05, dis 40&10 %
Gate, Automatic......℘ doz $12.50, dis 50 %
Gate, Common Sense......℘ doz pair $4.50, dis 50 %
Gate, Seymour's......dis 45&10 %
Gate, Shepard's......Nos. 1, 2, 3, 10, 20 & 25, dis 50&10 %
Rolled Blind Hinges......dis 60&10 %
Rolled Plate......dis 60&10 %
Rolled Raised......dis 60&10 %
Plate Hinges "Providence" { 8, 10 & 12 in., $5.55 ℘ 100 lb; over 12 in., $4.50 ℘ 100 lb } ..dis 10 %
Screw Hook and Strap { 8, 10, 12 in., $7.00 ℘ 100 lb; 14 to 36 in. $5.75 ℘ 100 lb } ..dis 10 %
Heavy Welded Hook { 8 to 12 in., $7.00 ℘ 100 lb; 14 in & up, $5.50 ℘ 100 lb } dis 10 %
Screw Hook and Eye { ⅜ & 1 in., 9c; ¾ in., 9c; ⅝ in., 10c; ½ in., 12c } dis 20 %
Wrought Strap and T......dis 55&10 %

Hoes.
Riveted Shank......℘ doz $5.00, dis 55 %
Socket......℘ doz $5.25, dis 55 %
Grub......℘ doz $11 dis 35 %
Planters'......dis 50 %
Scovill Pattern......dis 50 %
Handled Planters'......dis 50&10 %
Hick's Pat. Solid C. S. Planters'......dis 20&10&30 %
Hick's Pat Solid C. S., Scovill Pattern....dis 20&5&35 %
Winsted & Lane, Planters'......dis 25 %
Winsted & Lane, Scovill Pattern......dis 20&25 %
Magic......℘ doz $5 net

Hooks.
Bird Cage, Sargent's list......dis 60&10 %
Bird Cage, Reading......dis 40&10 %
Cotton......℘ doz $4.00, dis 50 %
Cotton Patented (N. Y. Mallet & Handle W'ks), dis 30 %
Cotton (Humason & Beckley Mfg. Co)......dis 40 %
Belt......dis 60&10
Bench—Hotchkiss' $5.00 ℘ doz......dis 10 %
Weston's, No. 1, $10.00; No. 2, $9.00 ℘ doz......dis 25 %
McGill's, $3.00 ℘ doz......dis 10 %
Clothes Line, Sargent's list......dis 65&10 %
Clothes line, Reading list......dis 35&5&10 %
Ceiling, Sargent's list......dis 60&10&10 %
Harness, Reading list......dis 40&10&10 %
Coat and Hat, Sargent's list......dis 60&10&10 %
Coat and Hat, Reading......dis 40&10&10 %
Wire Coat and Hat, Gem......dis 30&10 %
Wire Coat and Hat, Miles'......dis 70 %
Picture Hooks, Brown's Pat. Solid Brass, $4.00 ℘ gross......dis 25 %
Tassel and Picture (T. & S. Mfg. Co.)......dis 50 %
Wrought Staples and Hooks & Staples..dis 70&7½&10 %
Wrought Staples, Stanley's list......dis 70&7½&10 %
Wire Screw Hooks and Eyes......dis 55&10 %
Grass and Bush......dis 45@50 %
Whiffletree—Patent......dis 40 %
Hooks and Eyes—Malleable Iron......dis 60&10 %
Hooks and Eyes—Brass......dis 60&10 %

Horse Nails.

	Nos. 5	6	7	8	9	10	
Ausable, ℘ lb	31c	28c	26c	25c	24c	23c	dis 30&10 %
Clinton, Plain, ℘ lb		23c	21c	20c	19c	18c	dis 30&10 %
Clinton, Fin., ℘ lb		24c	22c	21c	20c	19c	dis 30&10 %
Essex, ℘ lb	31c	28c	26c	25c	24c	23c	dis 30&10 %
Putnam "	27c	24c	22c	21c	20c	19c	dis 5&7 %
Vulcan, "	26c	23c	21c	20c	19c	18c	dis 12½ %
Globe, "	24c	21c	19c	18c	17c	16c	dis 12½ %
A. C., "	20c	23c	21c	20c	19c	18c	dis 10&10 %
Ch'mpl'in Forged "	31c	28c	26c	24c	24c	23c	dis 30 %
New Haven, "	31c	28c	26c	25c	24c	23c	dis 30&10 %
Bridgewater, "	24c	21c	19c	18c	17c	16c	dis 25 %

Horse Shoes.
Burden......℘ keg $4.37½
R. I. Horse Shoe Co., Perkins' Improved Light, Medium and Heavy......℘ keg $4.37½
Walker's Forged, Light, Med. or Heavy......℘ keg $4.37½
Mule Shoes......℘ keg $5.37½
Dunning's Steel......℘ keg $9.25

Ice Awls, Chisels, &c.
American Ice Chisel......℘ doz $3.00 net
National Ice Chisel......℘ doz $6.25 dis 20 %
Novelty Ice Breakers......℘ doz. $6.25 dis 20 %
White's Sliding Head Picks......℘ doz $2.50 dis 40 %
Dunlap's Ring Picks......℘ doz $2.00 dis 10 %
Wood Head Picks, Sargent's......℘ doz $1.60 dis 50&10 %
Iron Head Picks, Sargent's......℘ doz $1.25 dis 50&10 %
Ice Mallets, Pick in head......℘ doz $1.75 dis 15 %
Ice Mallets, Pick in Handle......℘ doz $2.00 dis 15 %
Ice Axes, Small Cast or Malleable..℘ doz $1.20 dis 10 %
Combination Ice Tools......℘ doz $2.00 net

Ice Cream Freezers.
Amn. Mch. Co......dis 40 %
Torrey's......dis 40 %
Packer's......dis 40 %

Ice Creepers.
Safety Reversible......℘ gross $25
Arctic Solid......℘ gross $30 } dis 10 %

Ice Tongs.
Champion......℘ doz $6.00 dis 25&10 %
Family......℘ doz $2.75 dis 15 %

Kettles.
Brass, 7 to 13 inches inclusive......℘ lb 28c net
Brass larger than 13 inches......℘ lb 32c net

Knives.
Ames' Butcher Knives......dis 20 %
Ames' Shoe Knives......dis 15 %
Ames' Bread Knives......℘ doz $1.50 dis 15 %
Moran's Shoe and Bread Knives......dis 20 %
Hay and Straw, Wadsworth's......dis 33⅓
Table and Pocket......See Cutlery

Knobs.
Carriage (Jap'd 80c ℘ gross)......dis 60&10 %
Base—Common......dis 30&10 %
Hemacite Door Knobs......new list, dis 35&5 %
Door Mineral
Door Por. Jap'd
Door Por. Plated
Door Por. } Same discounts as Door Locks.
Furniture Plain......75c gross inch, dis 10 %
Furniture, Wood Screws......dis 20 %
Picture, Judd's......dis 60&10&10 %
Picture, Sargent's......dis 60&10 %
Hemacite, Picture......dis 35 %
Shutter, Porcelain......dis 60&10 %

Ladles.
Melting, Sargent's......dis 50&10 %
Melting, Reading......dis 30&10 %
Melting, Monroe's Patent......℘ doz $4.00 dis 40 %
Melting, P. S. & W......dis 30&10 %

Lanterns.
Tubular......No. 0, $8.65; No. 1, $10.15 With Guards 35c extra } net
Nail City......No. 1 ℘ doz $10; No. 2, $9, net
Meteor......No. 1, ℘ doz, $9.50; No. 2, $8.50, net
Hurricane, No. 2......℘ doz $5.75 net
Peerless, No. 5......℘ doz $11.75, dis 10&10 %
Brady's Patent......dis 10&10 %
Ætna......dis 10&20 %
Yankee......dis 10&10 %
De Beque......dis 10&10 %
Police Small, $6.25; Med., $7.50; Large, $10.00, net
Convex Reflector......$2.75 ℘ doz, dis 15 %

Lawn Mowers.
Excelsior and Clipper......dis 33⅓ %
Pennsylvania......dis 30 %
Philadelphia......dis 30 %

Lemon Squeezers.
Porcelain Lined......℘ doz $6.00, dis 30 %
Wood......℘ doz 3.00, dis 30 %
Eureka, Tinned......℘ doz 8.00, dis 10 %
Dunlap's Improved......℘ doz 3.75, dis 20 %
Sammis'...No. 1, $5; 2, $8.40; 12, $15 ℘ doz; dis 25&10 %
Townsend's Patent......$6.00 ℘ doz, dis 33⅓ %
Jennings "Star"......$2.00 ℘ doz net
The "Boss"......℘ doz $4.00, dis 10&10 %
Dean's Nos. 1, ℘ doz, $15.00; 2, $9.00; 3, $5.00.dis 20&10 %

Lines.—Linen Fish......dis 25&10 %
Cotton Chalk......dis 55 %
Silver Lake, Braided, Nos. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50 ℘ gross......dis 20 %
Masons' Linen, No. 3½, $1.50; No. 4, $2; No. 4½, $2.50......net
Masons' Colored Cotton......dis 45 %
Wire Clothes, Galvanized......each 250@400 net

Locks and Latches.
Cabinet, Eagle
Cabinet, Gaylord
Cabinet, Bridgeport } Changes made in list price of some numbers Jan. 1, 1881, dis 25&2 %
Cabinet, P. & F. Corbin......dis 25&2 %
Cabinet, A. E. Deitz......dis 30@40 %
Cabinet, Stoddard Lock Co......dis 40&5 %
Trunk, new list, Jan. 1, 1881......dis 15&2 %
Langstroth & Crane's List, Jan. 1, '77:
Round Key, Nos. 1 to 5......dis 40&10 %
Round Key, Nos. 5½ to 12......dis 40&10 %
Flat Key......dis 33⅓&10 %
A. E. Deitz, Flat Key......dis 30@40 %
Yale Lock Co., Flat Key......dis 40 %
"Shepardson" or "U. S."......dis 35 %
"Felter" or "American"......dis 33⅓ %
Plate......dis 33⅓&2 %
F. Many's "Extension Cylinder"......$10.50 ℘ doz net
DOOR LOCKS, ETC.
Branford
Norwalk
Norwich
P. & F. Corbin
Russell & Erwin
Mallory, Wheeler & Co.
Whipple Mfg. Co.
Trenton Lock Co. } List prices as revised March 8, 1882, with changes of Dec. 13, dis 45&10 % and 2 % for cash.
Reading Hardware Co. (low list)......dis 40&2 %
Padlocks—Russell & Erwin
Mallory, Wheeler & Co
Norwich Lock Mfg. Co.
Wm. Wilcox & Co } dis 30&10 % and 2 % for cash
Yale Lock Mfg. Co.'s "Standard"......dis 40 %
Romer's......dis 25@40 %
Conestoga......dis 60 %
Scandinavian (Moore Bros.)......dis 80 %
J. H. McWilliams......dis 10 %
A. E. Dietz......dis 35 %
"Star"......dis 45 %

Lustro.—4-oz. bottles, ℘ doz $2.00; ℘ gros $18.00 net

Mallets.—Hickory......dis 10&10 %
Lignumvitæ......dis 10&10 %
Penfield Block Co., Lignumvitæ & Hickory......dis 30 %

Meat Cutters.
Dixon's (P.S.&W.) Nos. 1 2 3 4
℘ doz..$14.00 17.00 19.00 30.00—dis 25&5 %
Miles' Challenge......Nos. 1 2 3
℘ doz..$22.00 30.00 40.00—dis 40 %
Perry's Nos. 1 2 3 4 4 g'rd 5 g'rd
Each...$3.00 4.00 5.00 11.00 13.00 36.00—dis 25&5 %
Woodruff's (P. S. & W.)......Nos. 100 150
℘ doz..$15.00 18.00—dis 25&5 %
Hales'......Nos. 11 12 13
℘ doz..$27.00 33.00 45.00—dis 50&10&2 %
Draw Cut..Nos. 5 2 6 8 10
Each..$60.00 75.00 80.00 225.00 400.00—dis 20 %
American......dis 20&10 %
Nos. 1 2 3 4 B 5
Each $5.00 7.00 10.00 25.00 50.00 60.00
Kieser's No. 55......$40 ℘ doz, dis 40 %
Kieser's Gem......$25 ℘ doz, dis 40 %
Kieser's Monarch......$45 ℘ doz, dis 40 %
Kieser's Butcher......$40 each, dis 20 %
Silver & Deming......dis 25 %
Pennsylvania......dis 40&10 %
Nos. 1 2 3 00
℘ doz $24.00 28.00 36.00 28.00
Beef Shavers (Enterprise Mfg. Co.)......dis 20&10 %

Mincing Knives.
Am. (2d quality), ℘ gross, 1 blade, $7 2 blades, $12 3 blades, $18......net
Lothrop's......dis 20&10 %
Smith's, ℘ doz, Single, $2.25; Double, $3...dis 33⅓&10 %
Cowles Hdw. Co......dis 55 %

Molasses Gates.
Stebbins Patterns......dis 70&10 %
Stebbins Genuine......dis 67½&10 %
Stebbins Tinned Ends......dis 40&10 %
Chase's Hard Metal......dis 40&10 %
Bush's......dis 20 %
Lincoln's Pattern......dis 60&10 %
Weed's......dis 15 %
Boss Nos. 1 2 3 4
$7.00 8.00 9.00 10.00..℘ doz. dis 60&10&10 %

Nails......See Trade Report

Nuts and Washers.—(In lots less than 100 lb add ½c to list; 1 lb. boxes, add 1c to list.)
Square Nuts......8 c off list
Hexagon Nuts......8½c off list
Washers......7½c off list

Nut Crackers.
Table (Humason & Beckley Mfg. Co.)......dis 33⅓ %
Blake's Pattern......℘ doz $2.00, dis 5 %
Turner & Seymour Mfg. Co......dis 50 %

Oakum.—is on 100 bales and over ½ % ℘ lb.
Best......℘ lb 9 c
U. S. Navy......℘ lb 8 c
Navy......℘ lb 6½c

Oilers.—Zinc and Tin......dis 60 %
Brass and Copper......dis 50 %
Malleable (Hammer's)......℘ doz. $5.00, dis 10 %
Prior's Patent or "Paragon" Zinc......dis 60 %
Prior's Patent or "Paragon" Brass......dis 50 %
Olmstead's, Tin and Zinc......dis 60 %
Olmstead's, Brass and Copper......dis 50 %
Broughton's, Zinc......dis 60 %
Broughton's, Brass......dis 50 %

Packing, Steam.
N. Y. Belting and Packing Co......dis 20 %

Pencils.
Faber's Carpenters'......high list, dis 50 %
Faber's Round Gilt......℘ gross $5.25, net
Dixon's Lead......℘ gross $4.50, net
Dixon's Lumber......℘ gross $6.75, net
Dixon's Carpenters'......dis 40&10 %

Picks.
Railroad, 5 to 6, $11.00; 6 to 7, $12.00......dis 45 %
Adze Eye, 5 to 6, $12.00; 6 to 7, $13.00......dis 45 %

Picture Nails.
Brass Head, Sargent's list......dis 60&10 %
Brass Head, T. & S. Mfg. Co......dis 50 %
Porcelain Head, Sargent's list......dis 50&10 %
Porcelain Head, Judd's list......dis 40@40&10 %
Porcelain Head, T. & S. Mfg. Co......dis 40 %
Niles' Patent......dis 40 %

Pinking Irons......℘ doz 75c, net

Plaiting Machines.
Magic......℘ doz $10.00, net
Astor Plaiting Machine......each $15.00, dis 20 %
Crown Plaiting Machines......dis 25 %
6 in., $6.00; 10 in., $8.00 each.

Planes and Plane Irons.
Bench, First Quality......dis 20 %
Bench, Second Quality......dis 25 %
Molding......dis 15 %
Bailey's (Stanley R. & L. Co.) new list, Jan. '79.dis 20&10 %
The Stanley (S. R. & L. Co.) new list, Jan. '79..dis 20&10 %
Bailey's "Victor"......dis 20&10 %
Defiance Adjustable......dis 30&10 %
Laflin Mfg. Co......dis 35 %
Plane Irons, Butcher's......$5.00 @ $5.25 to £
Plane Irons, Buck Bros......$5.00 to £
Plane Irons, Auburn Tool Co......dis 20 & 10 %
Plane Irons, The Globe Mfg. Co., "Baldwin Iron"......dis 20 & 10 %
Plane Iron, Ohio Tool Co......dis 20&10 %
Plane Irons, Sandusky Tool Co......dis 20&10 %

Pliers and Nippers.
Button's Patent......dis 33⅓ %
Hall's Pat. Compound Lever Cutting Nippers, No. 2, 5 in., $4.50; No. 4, 7 in., $21.00 ℘ doz......dis 25 %
Humason & Beckley Mfg. Co......[illegible]
Gas Pliers......dis 50 %
Eureka Pliers and Nippers......dis 40 %
Russell's Parallel......dis 25 %
P. S. & W. Cast Steel......dis 50&10 %
P. S. & W. Tinners' Cutting Nippers....add 6 % dis 10 %

Plumbs and Levels.
Disston's......dis 40 %
Stanley R. & L. Co.'s Pat. Adjustable......dis 65&10 %
Stanley R. & L. Co.'s Non-Adjustable......dis 65&10 %
Chapin's Patent Adjustable......dis 65&10&10 %
Chapin's Non-Adjustable......dis 65&10&10 %
Standard Rule Co.'s New Adjustable......dis 65&10 %
Standard Rule Co.'s Non-Adjustable......dis 65&10 %
Johnson's Patent Adjustable......dis 65&10 %
Pocket Levels......dis 65&10 %
Davis' Inclinometers......dis 20 %

Post Hole and Tree Augers.
Samson Post Hole Digger......℘ doz $37.50, dis 20 %
Fletcher Post Hole Augers......℘ doz $36.00, dis 20 %
Vaughan's Post Hole—6 in., $23.60; 7, 8 and 9 in., $25.00 ℘ doz....dis 20&10 %
Eureka Diggers ℘ doz $27.00......net
Leed's each $2.50......net

Pruning Hooks and Shears.
Disston's Combined Pruning Hook and Saw, ℘ doz $19.00, dis 20 %
Disston's Pruning Hook......℘ doz $12.50, dis 20 %
E. S. Lee & Co.'s Pruner......dis 33⅓ %
Pruning Shears......℘ doz $5.50 @ 6.00
Wheeler, M. & Co.'s Combination......℘ doz $12, dis 20 %
Dunlap's Saw and Chisel......℘ doz $9.00, dis 40 %

Pulleys.
Hot House and Tackle......dis 65&10 %
Jap'd Screw......dis 65&10 %
Brass Screw......dis 70&10 %
Jap'd Side......dis 65&10 %
Jap'd Clothes Line......dis 60&10 %
Hay Fork, Solid Eye....$4.50; Swivel, $5.00, dis 50&10 %
Hay Fork, "Anti-Friction"......$6.75, dis 10&10 %
Hay Fork, "F" Common and Pat. Bushed......dis 20 %
Hay Fork, Tarbox Pat. Iron......dis 20 %
Shade Rack......dis 45 %

Punches.
Belt or Drive......℘ doz $2.00; 2.25 2.50, dis 50 %
Bemis & Call Co.'s Cast Steel Drive......dis 50&5 %
Bemis & Call Co.'s Springfield Socket......dis 50&5 %

Spring.....₩ doz $7.00, dis 50&7½ %
Spring, Leach's Patent.....dis 15 %
Bemis & Call Co.'s Spring and Check.....dis 40 %
Solid, Tinners'.....₩ doz $1.44, dis 40 %

Rail.
Sliding, Door, Wrought Brass.....₩ lb 43c, dis 30 %
Sliding Door, Bronzed Wrt. Iron.....₩ foot 12c, dis 3⅓ %
Sliding Door Iron, Painted.....₩ foot 4c, dis 10&10 %
Barn Door.....Inch..... ⅝ ¾ ⅞
Per 100 feet $2.00 3.00 5.00—dis 10 %

B. D. for N. E. Hangers—
Small. Med. Large.
Per 100 feet.....$2.10 2.70 .30—net
Terry's Wrought Iron, 50c ₩ foot..... .....Net

Razors.
J. R. Torrey Razor Co.....dis 15 %

Razor Strops.
Genuine Emerson.....dis 45%
Badger's Emerson.....dis
Badger's (not Emerson).....dis 33⅓ %
Imitation Emerson.....₩ doz $2.00, dis 20 %
Hunt's.....dis 40&5 %
Chapman.....dis 15 @ 20 %
Saunder's.....dis 10 %
Torrey's.....dis 20 %

Rivets.
Iron and Tinned, new list, Dec. 10, 1881.....dis 40 %
In bulk, new list, Dec. 10, 1881.....dis 40 %
Copper Rivets and Burrs.....dis 50 %
Nos.. 7 8 9 10 11 12 13 14 15
₩ lb.. 49c 50c 52c 54c 56c 58c 60c 65c 70c

Rivet Sets......dis 33⅓&10 %

Rods.
Stair, Brass.....dis
Stair, Black Walnut.....60c. ₩ doz. dis

Rollers.
Barn Door, Sargent's list..... ..... dis 60&10&10 %
Acme (Anti-Friction).....dis 50 %

Rope.
Mnfs' List, May 16, 1883..... dis 10 ₩ lb
Manila.....½ inch and larger ₩ lb 15 c
Manila.....⅜ inch ₩ lb 15½c
Manila.....½ and 5-10 inch ₩ lb 16 c
Manila, Tar'd Rope.....₩ lb 14½c
Manila, Tar'd Lath Yarn.....₩ lb 15½c
Manila, Hay Rope.....₩ lb 15 c
Sisal.....½ inch and larger ₩ lb 12 c
Sisal.....⅜ inch ₩ lb 11½c
Sisal.....½ and 5-10 inch ₩ lb 12 c
Sisal, Hay Rope .....₩ lb 11 c

Rules. Boxwood. Ivory.
Chapin's } dis 70&10 % { dis 65&10 %
Standard }
Stanley..... dis 70&10 % ..... dis 65%
Stephens.....dis 70&10 %.....dis 65%

Sad Irons.
From 4 to 10.....₩ lb 3½c net
Self-Heating.....₩ doz $9.00 net
Self-Heating, Tailors'.....₩ doz $18.00 net
Gleason's Shield and Toilet.....dis 25 %
Mrs. Pott's Irons, Doubled Pointed.....dis 35 %
Mrs. Pott's Irons, Square Back.....dis 35 %
Enterprise Star Irons, new list, July 20, 1882...dis 35 %
Combined Fluter and Sad Iron....₩ doz $15.00, dis 15 %
Chinese Laundry (N. E. Butt Co.).....85c, dis 15 %
New England.....50 dis 15 %

Sand Paper.
Baeder & Adamson's Flint, 00 to 1½..$4.75 ₩ ream
Baeder & Adamson's Flint, 2, 2½ & 3..4.25 ₩ ream
Baeder & Adamson's Flint, Assorted. 4.75 ₩ ream
Baeder & Adamson's Star.....3.75 ₩ ream
Baeder & Adamson's Emery..₩ ream $6.50 @ 11.40
Bartles Flint.....$4.75&$5.25 ₩ ream dis 35 %
Bartles Harrison, $3.75 ₩ ream.....dis 35 %
New England, same list as B. & A. Flint.....dis 35 %
Gage's.....dis 30&5 %

Sash Cord.
Common.....₩ lb 13c net
Patent.....₩ lb 15c net
Silver Lake, Hemp.....₩ lb 50c, dis 10&5 %
Silver Lake, White Cotton.....₩ lb 50c, dis 10&5 %
Silver Lake, Drab Cotton.....₩ lb 55c, dis 10&5 %
Raw Hide, ₩ foot, ¼ in., 5c.; 5-16 in., 7c.; ⅜ in., 10c. dis 15 %
Steel Ribbon.....dis 10 %

Sash Locks.
Clark's, No. 1, $10.00; No. 2, $8.00 per gross.....dis 33⅓ %
Ferguson's.....dis 33⅓ %
Walker's.....net
Hammond's Window Springs.....dis 25 %
Northup Window Springs, No. 1, $10.00 ₩ gr.088..dis 15 %
The Perfect, Clark & Smith, Plain Jap. ₩ gro. $10.00 net
The Perfect, Clark & Smith, Por. K'b Jap. ₩ gro. $14 net
The Perfect, Clark & Smith, N-Plated..₩ gro. $27.00 net
"Universal".....dis 30 %

Sash Weights.
Solid Eyes, in 500 lb lots and over.....₩ lb 1¾cnet

Sausage Stuffers or Fillers.
Miles "Challenge".....₩ doz $20, dis 40 %
Perry.....₩ doz, No. 1½; No. 0, $21, dis 25&5 %
Draw Cut No. 4.....each $30.00, dis. 20 %
Enterprise Mfg. Co.....dis 20&10 %
Silver's.....dis 25 %

Saws.
Disston's Circular, Mill and Cross Cut.....dis 40 %
Disston's Hand, Panel, Rip, &c.....dis 20 %
Boynton's Lightning Cross Cuts, new list.....dis 40 %
Boynton's Circular and Mill.....dis 40 %
Boynton's Ice.....dis 25 %
Boynton's Lightning Hand, Panel and Rip.....dis 25 %
Wheeler & Clemson Mfg. Co.'s Hand.....dis 30 %
W. M. & C. Mfg. Co. Cross Cuts.....dis 30 %
Livingston's Butcher and Kitchen.....dis 20 %
Livington's Framed Wood—
Nos..... 101 102 103 104 105
Per doz....$10.00 8.50 10.00 7.50 5.20 net
Peace Circular and Mill.....dis 40 %
Peace Hand, Panel and Rip.....dis 25 %
Peace Cross Cuts.....dis 35 %
Peace Band Saws, all widths.....dis 10 %
Richardson's Circular.....dis 40 %
Richardson's Mill and X Cut.....dis 40 %
Richardson's Hand Panel, Butcher and Web Saws.....dis 25 %

Saw Frames.
White, Vermont.....₩ doz $1.50, dis 25&10%
Red, Polished and Varnished.....₩ doz $1.50, dis 10%
Saw Rods.....$10 list, dis10 & 10%

Saw Sets.
Boynton's Patent X Cut, per doz, $12.00; Hand Saw per doz, $20.00.....dis 25 %
Stillman's Genuine.....₩ doz $3.50 and $5.50 dis 10 %
Stillman's Imitation.....₩ doz $3.25, dis 30&10 %
Common Lever.....₩ doz $2.00, dis 30&10 %
Leach's.....No 0, $8.00; No. 1, $15.00, dis 15 %
Nash's.....dis 20&10 %
Hammer, Hotchkiss.....$5.50, dis 10 %
Hammer, Bemis & Call Co.'s new Patent.....dis 30&5 %
Bemis & Call Co.'s Lever & Spring Hammer..dis 30&5 %
Bemis & Call Co.'s Plate.....dis 10 %
Bemis & Call Co.'s Cross Cut.....dis 12½ %
Aiken's Genuine.....$13.00, dis 50&10 %
Aiken's Imitation.....$7.00, dis 50 %
Hart's Patent Lever.....dis 20 %
Disston's.....dis 20 %
Morrill's.....No. 1, $15 No. 2, $12, dis 40&5 %

Scales.
Hatch, Counter, No. 171.....₩ doz $42, dis 45 %
Hatch, Tea, No 161.....₩ doz $15.00, dis 45 %
Union Platform.....$6.00, dis 45 %
Fairbanks'.....dis 20 %
Richlé Bros.....dis 20 & 10 %
Buffalo Scale Co.....dis 20&5 %
Forsyth Scale Co.....dis 25 %
Bower's.....dis 20&10 %
Chatillon's Grocers'.....dis 40 %
Chatillon's Eureka.....dis 25 %
Family Universal, 12 lb, $30; 24 lb, $36.....net
Family Favorite.....dis 30 %
Family, Turnbull's.....dis 30 %
Scale Beams, List of January 12, 1882.....dis 33⅓&10 %

Scrapers.
Adjustable Box Scraper (S. R. & L. Co.), $6.50, dis 20&10 %
Box 1 Handle.....₩ doz $4.00, dis 10 %
Box 2 Handle.....₩ doz $6.00, dis 10 %
Defiance Box and Ship.....dis 20&10 %
Foot.....dis 45&10 %
Ship, common.....₩ doz $3.50 net
Ship, Providence Tool Co.....dis 10 %

Screen Corners.
Porter's Pat Window and Door Frame.....dis 33⅓

Screw Drivers.
Douglas Mfg. Co.....dis 20&10&10 %
Disston's.....dis 40 %
Disston's Patent Excelsior.....dis 40 %
Buck Bros.....dis 25 %
Stanley Rule & Level Co.'s, Varnished Hdls..dis 60&10 %
Stanley Rule & Level Co.'s, Black Handles..dis 50&10 %
Sargent & Co.'s.....dis 50&10 %
Gay's Double Action Ratchet
₩ doz, 4 in., $8.00; 5 in., $10.20; 6 in., $12.00—dis 35 %
Mallett & Co.'s Double Action Clutch
₩ doz, 4 in., $7.00; 5 in., $8.00; 6 in., $9.00—dis 15 %
Champion.....dis 25 %
Clark's Patent.....dis 25 %

Screws.
Flat H'd Iron, new list, Dec. 27, 1882.....dis 50&10 %
Round Head Iron, new list, Dec. 27, 1882.....dis 45&10 %
Flat Head Brass, new list, Dec. 27, 1882.....dis 50&10 %
Round Head Brass, new list, Dec. 27, 1882...dis 45&10 %
Brass and Silver Capped.....dis 40 %
Japanned, list of Plain Screws.....dis 40&10 %
Coach, Patent Gimlet Point, 65&10 %, by the keg, dis 70 %
Coach, Common or Lag.....dis 60&5&10 %
Bed.....dis 10 %
Machine, Flat Head, Iron.....dis 55 %
Machine, Round Head, Iron.....dis 50 %
Bench, Iron.....dis 55&10 %
Bench, Wood, Beech.....₩ doz $3.00, dis 10 %
Bench, Wood, Hickory.....dis 20&10 %
Hand, Wood.....dis 20&10 %
Hand Rail, Sargent's.....dis 66⅔&10 %
Hand Rail, Hunnason, Beckley & Co.'s....dis 66⅔&10 %
Hand Rail, Am. Screw Co., list of Jan. 1, '81.....dis 70 %
Jack (Wilson's).....dis 25 %

Screw Window Balances.
R. B. Hagunin's, No. 1, $2.10; No. 2, $1.75; No. 3 $1.50.....₩ doz net

Scroll Saws.
Lester, $10.00. .. ..dis 25 %
Rogers, $3.50.. .....dis 25 %

Shears and Scissors.
American (Cast) Iron.....dis 70@70&10 %
Pruning.....see Pruning Hooks and Shears.
Barnard's Lamp Trimmers.....₩ doz $3.75
Tinners'.....add 6 %, dis 10 %
Seymour's, List, Dec., 1881.....dis 60 %
Heinsch's, List, Dec., 1881.....dis 60 %
Heinsch's Tailor's Shears.....dis 33⅓ %
Mass. Cutlery Co. St. Trimmers.....dis 75 %
Wiss, J., & Sons' list, Dec., 1881.....dis 60 %

Sheaves.
Sliding Door, M. W. & Co., list.....dis 45&2 %
Sliding Door, R. & E. list.....dis 60&10&2 %
Sliding Door, Patent Roller.....dis 60&10&2 %
Sliding Door, Patent Roller, Hatfield's....dis 60&10&2 %
Sliding Door, Russell's Anti-Friction....dis 60&10&2 %
Sliding Door, Moore's Anti-Friction.....dis 60 %
Sliding Shutter, R. & E. list.....dis 50&10&2 %
Sliding Shutter, Sargent's list.....dis 50&10 %
Sliding Shutter, Reading list.....dis 50&10 %
Moore's Anti-Friction (Hanging).....dis 60 %

Shovels and Spades.
Ames, New list, July 1, 1881.....dis 15 %
Griffiths.....dis 50 %
Old Colony.....dis 15 %
Payne Pettebone & Son, new list.....dis 40&10 %
Payne Pettebone & Son, R. R. Shovels.....dis 15 %
Remington's (Lowman's Patent).....dis 30 %
Rowland's.....dis 50&5 %

Shovels and Tongs.
Iron and Brass Head, R. & E. list.....dis 60&10&2 %
Iron and Brass Head, P. S. & W.....dis 60&5&10 %
Polished Steel, new list.....dis 50&10&2 %

Slates.
Square Frames, by case.....dis 70 %
Less than a case.....dis 65&10 %

Spoke Shaves.
Defiance Metallic.....dis 20&10 %
Iron.....dis 45 %
Wood.....dis 30 %
Bailey's (Stanley R. & L. Co.), new list.....dis 30&10 %
Stearns'.....dis 30&10 %

Spoke Trimmers.
Bonney's.....₩ doz $10.00, dis 40&5 %
Stearns'.....₩ doz $9.00, dis 20&10 %
Ives'.....No. 1, $15.00; No. 2, $12.00 ₩ doz, dis 55&10 %
Douglass'.....₩ doz $9.00, dis 15 %

Spoons.
Basting.....dis 65&10 %
Riveted Table and Tea.....dis 60&10 %
Solid Table and Tea.....dis 60&10&5 %
Britannia.....dis 60&10 %
Reed & Barton.....dis 40&10&5 %
Holmes, Booth & Haydens.....dis 40&10&5 %
German Silver.....dis 50&10&5 %
Cast Steel, Silver Plated.....dis 33⅓ %
Tin (P. S. & W.), Teas.....$1.25 ₩ gross, net
Tin (P. S. & W.), Tables.....$2.00 ₩ gross, net
Tin (Cowles Hdw. Co.).....dis 10 %
Tin (Cowles Hdw Co.), case lots.....dis 20 %

Stocks and Dies......dis 55&10 %
"Lightning" Screw Plate.....dis 10 %

Stone.
Hindostan No. 1, 6c; Axe, 8c.....dis 40 %
Hindostan Hacker Stone.....₩ gross $12.00 dis 10 %
Sand Stone.....₩ lb 6c, dis 33⅓&10 %
Washita Stone.....No. 1, ₩ lb 18c net
Washita Stone.....No. 2, ₩ lb 10c net
Washita Stone, Slips.....No. 1, ₩ lb 37c net
Arkansas Stone No. 1, 4 to 6 in.....₩ lb $1.35 net
Arkansas Stone No. 1, 6 to 9 in.....₩ lb $2.00 net
Turkey Oil Stone (Chase).....4 to 8 in., ₩ lb, 60c, dis 10 %
Turkey Slips (Chase).....$1.75 ₩ lb dis 10 %
Lake Superior (Chase).....₩ lb 16c, dis 10 %
Lake Superior, Slips (Chase).....₩ lb 30c, dis 10 %
Grindstones, Family, Loring's.....dis 10 %

Stove Polish.
Joseph Dixon's.....₩ gross $5.00, dis 10 %
Gem.....₩ gross $4.50, dis 10 %
Gold Medal.....₩ gross $6.00, dis 25 %
"Mirror".....₩ gross $5.00, dis 5 %
Ruby.....₩ gross $3.75, net
Rising Sun.....₩ gross $5.75, net
Dixon's Plumbago.....₩ lb 8c. net
Boynton's Noon Day ₩ gross No. 1, large, $5.40 No. 2, small, $3; No. 3, medium, $4.

Squares.
Steel.....dis 10 %; full cases, dis 50&10 %
Iron.....dis 10 %; full cases. dis 50&10 %
Nickel Plated.....add $2.50 @ $4.00 ₩ doz, net
Try Square and T Bevels.....dis 50&10 %
Disston's Try Square and T Bevels.....dis 40 %
Winterbottom's Try and Mitre.....dis 20&10 %

Tacks, Brads, &c.
New List, Sept. 1, 1882.
Tinned Swedes Tacks.....dis 30 %
Tinned American Tacks.....dis 30 %
Swedes Tacks, all kinds.....dis 30 %
American Cut Tacks.....dis 30 %
Copper Tacks and Nails.....dis 30 %
Swedes Hungarian Nails.....dis 35 %
Gimp and Lace Tacks.....dis 50 %
Gimp and Lace Tacks, Tinned.....dis 50 %
Finishing Nails.....dis 25 %
Trunk and Clout Nails.....dis 25 %
Common and Patent Brads.....dis 20 %
Basket Nails.....dis 20 %
Brush Tacks.....dis 20 %
Leathered Carpet Tacks.....dis 20 %
Cigar Box Nails.....dis 20 %
Chair Nails.....dis 20 %
Double-pointed Tacks.....dis 40& 5%
EXTRA 10 % ON ALL

Tap Borers.
Common and Ring.....dis 20 %
Ives' Tap Borers.....dis 15&10 %
Enterprise Mfg. Co.....dis 20&10 %

Tapes, Measuring.
American.....dis 20 %
Spring.....dis 25&10 %
Chesterman's.....regular list dis 20@25 %

Thermometers.
Tin Case.....dis 75&10 %

Tobacco Cutters.
Enterprise Mfg. Co. (Champion).....dis 20&10 %
Wood Bottom.....₩ doz $10.00, dis 25&10 %
All Iron.....₩ doz $8.25, dis 15 %
Nashua Lock Co.'s.....₩ doz $15.00 dis 50&5 %
Wilson's.....dis 35 %
Clipper (Sargent & Co.).....₩ doz $18.00. dis 20 & 10 %

Toe Calks.
Winsted.....₩ lb 90, dis 5

Tinners' Tools and Machines.
Machines (P. S. & W.).....list add 20 %
Tools (P. S. & W.).....add 6 % } dis 10 %

Transom Lifters.
Wollensak's Patent.....dis 35 %
Reiher's Patent, new list, Feb., 1882.....dis 20&10&10 %
Excelsior.....dis 50&10&2 %

Traps.
Game, Newhouse.....dis 35 %
Game, Oneida Pattern.....dis 60 %
Game, Blake's Patent.....dis 40&5 %
Mouse, Wood, Choker.....₩ doz holes, 14c
Mouse, Round Wire.....₩ doz $1.50, dis 10 %
Mouse Cage, Wire.....₩ doz $2.50, dis 10 %
Mouse, Catch-em-alive.....₩ doz $2.50, dis 10 %
Mouse, "Bonanza".....per gross $10.00 net
Rat, "Decoy".....₩ doz $10.00, dis 10 %

Trowels.
Lothrops' Brick and Plastering.....dis 25 %
Reed's Brick and Plastering.....dis 15 %
Disston's Brick and Plastering.....dis 20 %
Peace's Plastering.....dis 25 %
Clement & Maynard's.....dis 20 %
Rose's Brick.....dis 15 %
Brades' Brick.....dis 25 %
Worrall's Brick and Plastering.....dis 20 %
Garden.....dis 55 %

Triers.
Butter and Cheese.....dis 25 %

Trucks (Warehouse, &c.
Penfield Block Co.'s list, 1882.....dis 35 %

Vises.
Solid Box.....dis 35 %
Solid "Crown" (A. H. Hilditch).....40 to 100 lb, 15c net
Solid, Peter Wright's.....15½c
Solid, Wilkinson's.....14@15c
Parallel, Parker's.....dis 10 %
Parallel, Wilson's.....dis 35&10 %
Parallel, Howard's.....dis 20&10 %
Parallel, Merrill's.....dis 15 %
Parallel, Sargent's.....dis 60&10 %
Parallel, Backus and Union.....dis 40 %
Parallel, Oval Slide.....dis 40 %
Parallel, Double Screw Leg.....dis 15&10 %
Parallel, Prentiss.....dis 25 %
Parallel, Simpson's Adjustable.....dis 25&5 %
"Family," List.....not

Saw Filers, Bonney's.....₩ doz $24.00, dis 20&10 %
Saw Filers, Stearn's.....dis 20&10 %
Saw Filers, Hopkins'.....₩ doz $17.50, dis 10 %
Saw Filers, Reading.....dis 40&10 %
Cowell Hand Vises.....dis 20 %
Richardson's Vise and Anvil.....dis 25 %

Washer Cutters.
Smith's Patent.....₩ doz $12.00, dis 25 %
Johnson's.....₩ doz $11.00, dis 33⅓ %
Penny's.....₩ doz Pol. $17.50; Jap'd, $16.50, dis %
Appleton's.....₩ doz $16.00, dis 60&10 %

Washers.—See Nuts and Washers.

Well Wheels.....dis 60&10 %

Wire.
Brass and Copper.....dis 30 %
Market, Bright and Annealed.....dis 52½ @ 55 %
Market, Coppered.....dis 47½ @ 50 %
Market, Galvanized.....dis 42½ @ 45 %
Market, Tinned, Tinned list.....dis 45 @ 47½ %
Stone, Bright and Annealed, Nos. 0 to 18.dis 55 @ 57½ %
Stone, Bright and Annealed, Nos. 19 to 26. dis 60 @ 62½ %
Stone, Bright and Annealed, Nos. 27 to 36. dis 65 @ 67½ %
Stone, Galvanized, Nos. 19 to 30.....dis 42½ @ 45 %
Stone, Tinned, Tinned list.....dis 45 @ 47½ %
Tinned Broom Wire.....dis 55 @ 57½ %
Cast Steel Wire.....dis 45 @ 47½ %
Annealed Fence, Nos. 8 & 9.....dis 52½ @ 55 %
Annealed Grape, Nos. 10 to 14.....dis 52½ @ 55 %
Fence Staples.....₩ lb 5½ @ 5¾c
Fence Staples, Galvanized.....₩ lb 6¼ @ 6¾c
Stubs Steel Wire.....$6.00 to $7 dis 30 %
Japanned Barb Fence.....₩ lb 5 c
Galvanized Barb Fence.....₩ lb 6 c
Steel Music Wire, Nos. 7 to 30.....$1.50 ₩ lb
Picture Wire, T. S. & J.....dis 40 %
Clothes Line Wire, Galvanized.....₩ coil 25 @ 40c net
Wire Cloth, green, drab and black, ₩ sq. ft., 2½c, net

Wrenches.
American Adjustable.....dis 45 %
Baxter's Adjustable "S," list Jan., 1880.....dis 20&5 %
Baxter's Diagonal.....dis 20&5 %
Coes' Genuine.....dis 50&3 %
Coes "Mechanics".....dis 50&10&3 %
Coes' Pattern, Malleable.....dis 75 %
Coes' Pattern Wrought.....dis 60 @ 65 %
Girard Standard.....dis 60 %
Girard Agt.....dis 70 %
Bemis & Call's Patent Combination.....dis 20 %
Bemis & Call's Merrick 's Pattern.....dis 35 %
Bemis & Call's Brigg's Pattern.....dis 25 %
Bemis & Call's Cylinder or Gas Pipe.....dis 40 %
Van Wagoner & Williams' Basin.....₩ doz $4.50
Aiken Pocket (Bright).....$6.00, dis 50&10 %
The Favorite Pocket (Bright).....₩ doz $4, dis 40 %
Webster's Patent Combination.....dis 25 %

Wringers. Per doz.
Universal, XX, No. 2½.....48.00
Universal, XX, No. 3.....44.00
Universal, XX, No. 1½.....51.00
Universal, XX, No. 1.....66.00
Peerless, no Cogs, No. 1.....42.00
Peerless, with Cogs, No. 2½.....45.00
Peerless, with Cogs, No. 2.....48.00
Peerless, with Cogs, No. 3.....54.00
Peerless, with Cogs, No. 4.....60.00
Eureka, No. 2.....42.00
Novelty No. 2, for Common Tubs.....$42.00
Novelty No. 3, for Common Tubs.....$48.00
Excelsior No. E, for Stationary Tubs.....$51.00
Excelsior No. F, for Stationary Tubs.....$57.00
Excelsior No. E, with Folding Bench.....$60.00
Excelsior No. F, with Folding Bench.....$66.00
Lots of 1 doz., dis $3 ₩ doz.; lots of 5 doz., dis $6 ₩ doz.

NEW YORK WHOLESALE PRICES, June 6, 1883.

METALS.

IRON.—DUTY. Bars, 1 to 1½c. ₩ ℔. Sheet, Hand Rods and Scroll, 1¼ to 2½c. ₩ ℔; provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 ₩ ton; Polished Sheet, 3c. ₩ ℔; Wrought Scrap, $8 ₩ ton; Cast Scrap, $6 ₩ ton. Railroad 70c. ₩ 100 ℔. Boiler and Plate, 1½c. ₩ ℔

American Iron		
Foundry, No. 1X	₩ ton	$ 0 00 @ 22 00
Foundry, No. 2X	₩ ton	18.00 @ 1 50
Gray Forge	₩ ton	17 50 @ 19 00
Scotch Iron.		
Eglinton	₩ ton	21.25 @ 22 00
Carnbroe	₩ ton	23.00
Coltness	₩ ton	24.50 @ 24.75
Shotts	₩ ton	24.00
Glengarnock	₩ ton	22.50 @ 24.50
Gartsherrie	₩ ton	24.0
Langloan	₩ ton	24 50
Summerlee	₩ ton	24 0
Rails.		
Steel at Eastern mills	₩ ton	35.00
Old Rails 18	₩ ton	22.00 @ 23.0
Old Rails DH	₩ ton	
Scrap.		
Wrought, ₩ ton, from ship and yard		23.00 @ 26.00
Bar Iron from Store.		
Common Iron		
⅜ to 1 in. round and square	₩ ℔	2.1c @ 2.20c
1 to 6 in. x ⅜ to 1 in	₩ ℔	
Refined Iron:		
⅜ to 2 in. round and square	₩ ℔	$2.30 @ 2 .0
1 to 6 in. x ⅜ to 1 in	₩ ℔	
1 to 6 in. x ½ and 5-16	₩ ℔	2 50 @ 2 60
Rods—⅜ and 11-16 round	₩ ℔	2 50 @ 2.6 c
Bands—1 to 6 x 3-16 to No. 12	₩ ℔	2.70 @ 3
Norway Nail Rods		¼ @ ¼

Sheet Iron.

	Common American	R. G. American.
Nos. 10 to 20	₩ ℔ 3½ @ 3½c	4½c
21 to 24	₩ ℔ 3½ @ 3¾c	4¾c
25 to 26	₩ ℔ 3¾ @ 4 c	5 c
27	₩ ℔ 4 @ 4¼c	5 c
28	₩ ℔ 4¼ @ 4¼c	5¼c
	R. R.	20 qual.
Galvanized 10 to 20	₩ ℔ 7¼c	7 c
Galvanized, 21 to 24	₩ ℔ 8¼c	7¾c
Galvanized, 25 to 26	₩ ℔ 9 c	8 c
Galvanized, 27	₩ ℔ 9¼c	8½c
Galvanized, 28	₩ ℔ 10½c	9 c
Patent Planished A	₩ ℔ 10½c	R. 6½c
Russia	₩ ℔ 13	@ 14c
American Cold Rolled	₩ ℔	c @ 7½c

COPPER.—DUTY: Pig, Bar and Ingot, 5c; Old Copper 4c ₩ ℔. Manufactured including all articles of which Copper is a component or chief value, 45 % ad valorem.

American Ingot ₩ ℔ See Trade Report.

SHEATHING BRAZIERS COPPER, BOLTS, &c. (*Combination List.*)

Brazier's Copper, ordinary sizes, 16 oz. per sq. ft., and over	₩ ℔ 30c
Braziers' Copper, ordinary sizes, under 16 oz. and over 12 oz., ₩ sq. ft.	₩ ℔ 33c
Braziers' Copper, 10 oz. and 12 oz., ₩ sq. ft.	₩ ℔ 34c
Braziers' Copper, Lighter than 10 oz. ₩ sq. ft.	₩ ℔ 36c
Circles less than 24 in. in diameter	₩ ℔ 33c
Circles 24 in. diameter and over	₩ ℔ 36c
Segment and Pattern Sheets	₩ ℔ 33c
Locomotive Fire Box Sheets	₩ ℔ 33c
Sheathing Copper, over 12 oz. ₩ sq. ft.	₩ ℔ 33c
Bolt Copper	₩ ℔ 30c
Copper Bottoms	₩ ℔ 31 @ 30c

No Copper in Sheathing except 14x48 inches, and not to exceed 34 oz. to the sq. ft.

TINNING.

Sheets 14 x 28	₩ sheet 8c
All other size Sheets, 2½c ₩ sq. ft.	

For tinning both sides, double the above amount.

O'NEILL'S PATENT PLANISHED COPPER.—Net.

14x48.

14 and 16 oz. and heavier	₩ ℔ 37c
By the case	₩ ℔ 36c
12 oz. and lighter	₩ ℔ 40c
"	₩ ℔ 39c

Boiler Sizes.

7 in., 14x52. 8 in., 14x56. 9 in. 14x60.

14 and 16 oz. and heavier	₩ ℔ 39c
By the case	₩ ℔ 38c

(And all sizes not over 20 in. wide.)

24x48&30x60.

14 and 16 oz. and heavier	₩ ℔ 41c
"	₩ ℔ 44c

BRASS.

Brown & Sharp's Gauge the Standard for Metals. Old English Gauge the Standard for Wire.

BRASS MANUFACTURERS' PRICE LIST.—dis. 30 %. June 20, 1882.

Cash prices for Roll and Sheet Brass. For less quantities than 100 ℔s add 50. ₩ ℔.

HIGH BRASS.

All Nos. not thinner than No. 28, wider than 2 in., not wider than 14 in.	30c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in., inclusive	31c
All Nos. to No. 28, inclusive, and widths over 20 to 30 in., inclusive	32c

½c. ₩ ℔ advance on each No. above Nos. 28 to 34, inclusive.

All Brass thinner than No. 38 is Platers' Brass, at. . . 33c

Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 in., in width wider than 2 in. 37c

Printers' Rule	46c
Sheets wider than 40 in. and under 42 in.	47c
" 40 in. and over	50c

Circular Sheets, in diam. from 4 in. to 14, inclusive . . 30c

"	"	over 14 " 20, "	45c
"	"	20 " 30, "	46c
"	"	30 " 40, "	48c
"	"	40 in.	50c

LOW BRASS.

Four cents ₩ ℔ more than High Brass

Gilding Metal, 5c ₩ ℔ more than High Brass.

Platers' or Gold Metal { In Bars | Sawed | Planed or Polished } 48c / 51c / 54c

FOR SLITTING.

Metal, in width 1 in. to ¼ in. to No. 28, inclusive, 1c ₩ ℔ advance.

Metal, in width 2 in. to 1 in. thinner than No. 28, 2c ₩ ℔ advance.

Metal, in width 1 in. to ¼ in. thinner than No. 28, 3c ₩ ℔ advance.

Metal in width ⅛ in. to ¼, inclusive, not thinner than No. 28, 2c ₩ ℔ advance.

Metal in width ⅛ in. to ¼ thinner than No. 28, 5c ₩ ℔ advance.

Metal, ¼ in. in width and less, 10c ₩ ℔ advance.

Any of the above widths cut to particular lengths, add 5c ₩ ℔.

GERMAN SILVER MARKET METAL AND WIRE.

	Market Metal.	Wire
4 per cent., 12 inch to No. 26	$ .52	$ .72
6 " " "	.56	.76
8 " " "	.74	.92
5 " " "	.78	1. 3
8 " " "	.87	1.13

German Silver Sheets over 12in. wide and weighing more than 10 ℔., $1 ₩ ℔.

Advance 2c. for each additional inch in width above 12 in. and 2c. ₩ ℔ on each No. thinner than Nos. 26 to 2, inclusive.

All German Silver thinner that No. 36 is Platers', at 40c. ₩ ℔ additional.

German Silver Scrap, one-half less than net price of 12 in. Market Metal. German Silver Turnings, Filings and Chips, half the price of Scrap.

BRASS AND COPPER WIRE.

	High Brass.	Low Brass.	Gild'g and Copper.
No. 0 to 2c	$0.33	$0.37	$0.46
No. 3	.39	.40	.46
No. 4	.37	.41	.47
No. 23	.38	.42	.48
No. 24	.40	.44	.50
No. 25	.43	.47	.53
No. 26	.45	.49	.55
No. 27	.48	.52	.58
No. 28	.52	.56	.63
No. 29	.55	.59	.66
No. 30	.59	.63	.72
No. 31	.62	.66	.76
No. 32	.66	.70	.84
No. 33	.70	.74	.91
No. 34	.74	.78	1.03

Spring Wire 2c ₩ ℔ advance

Flat Square and Half-Round Wire 5c ₩ ℔ advance on Round Wire.

Fancy Wire not less than 10c ₩ ℔ advance on Round Wire.

Brass Rods, No. 8 and larger, not less than 2 feet lengths. 2c.

Wire straightened and cut smaller than No. 8 and not less than 2 feet lengths, 4c.

Wire and Rods less than 2 feet lengths, special rates.

Twelve cents per ℔ extra for spooling on 1 ℔ spools No 36.

MISCELLANEOUS.

Brass Pail Ears	$0.40
Brass Door Rail	.41

SCRAP.—Net.

High Brass Scrap	.13c
Low Brass Scrap	.12c
Gilding	.10c

Turnings, Fillings and Chips half the price of Scrap. Terms—Net cash. Interest to be added after thirty days.

TUBING.—dis. 50 %.

Plain to No 20 inclusive above ¼ in. to 3 in.	$ .47
Plain above 3 in.	.53

Nos. 21, 22, 23, two cents advance on List for each Number.

Nos. 24, 25, 26, four cents advance on List for each Number.

Above No. 26, special rates.

Open, ⅛ inch . . . 75

Open, 3-16 inch . . . 1.10

Open, ¼ inch . . . 1.0c

All Mandrel Drawn Tubes 4 cents advance on List Prices.

Fancy Tubing to No. 22 . . . 60

English, Scotch and Extra Patterns Fancy Tubing 4 to No. 20 . . . 55

Tubing Sawed or Cut 2 to 4 feet long, 2 cents advance on List.

Add two cents, ½ cent for each additional cutting under 2 feet

All Mandrel Drawn Tubes under ⅜ in. 25 cents per pound advance.

ZINC TUBING—dis. 25 %.

Plain	27
Fancy	33
Scotch and Extra Patterns	36

GERMAN SILVER TUBING.—dis 25 %.

4 Per cent.	.80
6 Per cent.	.90
9 Per cent.	1.00
12 Per cent.	1.2
15 Per cent.	1.35
5 Per cent.	1.45
18 Per cent.	1.10
1 Per cent.	1.60

STEEL.—DUTY: Bars, Ingots, Sheets and Coils, valued at 7c ₩ ℔, or under, 2½c over 7c and not above 12, 9c ₩ ℔; over 11, 3½c ₩ ℔, and 10 % ad val. Railway Bars, 1½c ₩ ℔. Railway Bars, in part Steel, 1c ₩ ℔. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as Steel.

American Cast Steel.

For American Steel see quotations under heading of Pittsburgh.

English Steel.

Best Cast	₩ ℔ 15½c
Extra Cast	₩ ℔ 16½c
Circular Saw Plates	₩ ℔ 16c
Round Machinery, Cast	₩ ℔ 10c
Swaged, Cast	₩ ℔ 18c
Best Double Shear	₩ ℔ 14½c
Blister, 1st quality	₩ ℔ 13c
German Steel, Best	₩ ℔ 11c
2d quality	₩ ℔ 10c
3d quality	₩ ℔ 9c
Sheet Cast Steel, 1st quality	₩ ℔ 15½c
2d quality	₩ ℔ 14½c
3d quality	₩ ℔ 12½c
ANTIMONY	See Trade Report
LEAD.—DUTY: Pig, 2c ₩ 100 ℔ Old Lead, 1½c ₩ ℔	
Pipe and Sheet, 2½c ₩ ℔	
American	4.65 @ 4.70c
Bar	0c
Pipe	6½c, dis 10 %
Tin Lined Pipe	11c, dis 10 %
Sheet	7½c, dis 10 %
Shot	Drop 7c, Buck. 8c
Chilled Shot	8c

RABBITT METAL.

N. P. C.	₩ ℔ 8c
A. 28c; B. 22c; C. 15.	

TIN.—DUTY Plates, Sheets Tagger and Terne, 1.10 ₩ ℔; Electro-galvanized Plates, 2c ₩ ℔; Manufactures of, not enumerated, 35 per cent. ad val. Bars, Block and Pigs free. Bancs, subject to dutv of 10 per cent.

Banca	₩ ℔ 23½c
Straits	₩ ℔ 23½c
English	₩ ℔ 23 0

TIN PLATES.

I C 10X14 } I C 14X20 } Prime Charcoal	$6 25 @6. 50
Second quality	$5.87½ @ 6.25
I C 12X12 Prime Charcoal	6.50
I X 10X14 } I X 14X20 } Prime Charcoal	7.75 @ 8.00
Second quality	$7.25 @ 7.10
I X 12X12. Prime Charcoal	6.25
D C 12½X17, Prime Charcoal	5.75
D X 12½X17, Prime Charcoal	7.25
For each additional X add	1.50

COKE TIN PLATE.

	Best.	Ordinary
I C 10X14 } I C 14X20 }	$5.40	$5.15 @ 5.40
I C 12X12	5.75	5.40 @ 5.50

TERNE PLATE.

	Prime Char.	2d Qual.	Coke.
I C 14X20	$5.37½ @ 5.40	5.25	5.12½
I X 14X20	7.00	....	....
I C 20X28	10.75 @ 11.25	10.50	10.00 @ 10.25
I X 20X28	15.00	....	....
I C 20X200	14.00	....	....
I C 14X20 M. F. Brand			$7.50

SOLDER—¼ & ½ . . . 15c

Extra . . . 13½c

No. 1 . . . 12 c

SPELTER.—DUTY: in Pigs, Bars and Plates, $1.50 ₩ 100 ℔.

American, cash . . . 5.00 @ 5.2c

ZINC.—DUTY Pig or Block, $1.50 ₩ 100 ℔; Sheet 2½c ₩ ℔.

Sheet, Cask	6¼ @ 6¼c
Sheet, Open	6¼ @ 70

Paper Stock, &c.

(*Dealers Selling Prices.*)

	Cents ₩ ℔
White Shirt Cuttings, No. 1	6¼ @ 7
White Shirt Cuttings, No. 2	5 @ 5¼
Mill Assorted Whites	5¼ @ 5½
Unbleached Muslins	5½ @ 6
City Whites, No. 1	4½ @ 4¾
New Canton Flannels	@
New Seconds, light	3¼ @ 3¾
New Seconds, dark	2½ @ 3
No. 2 Whites	2¼ @ 2¾
Cotton Canvas	4½ @ 4¾
Linen Canvas, No. 1	4½ @ 4¾
Seconds, City No. 1	2¾ @ 3
Seconds, City No. 2	1¾ @ 2
Colors, per 100 ℔s	70 @ 0
Manila Rope	3½ @ 3¾
Manila Rope, Tarred	3½ @ 3¾
Gunny Bagging No. 1	2 @ 2¼
Gunny Bagging, No. 2	1¾ @ 1¾
Kentucky Bagging	4½ @ 4¾
Burlap Bagging, No. 1	3¾ @ 3¾
Tar Shakings	2 @ 2¼
Hemp Twine Stock	4¾ @ 4½
Hard White Shavings, No. 1	4½ @ 4¾
Soft White Shavings, No. 1	3¾ @ 3¾
White Shavings, No. 2, soft	1 @ 1
Mixed Shavings, part white	2½ @ 2
Ledger and Writing	1 @ 1½
Solid Stock	2½ @ 2¾
Book Stock, No. 1, light	1¾ @ 1¾
Old Newspapers	1½ @ 1¾
Pure Manilas	1¾ @ 2
Bogus Manilas and Hardwares	1 @ 1
Commons per 100 lbs	60 @ 70
Binders' Board Cuttings	¾ @ 1
Straw Board Cuttings	¾ @ .0c

Paints, Oils, &c.

Paints.

Black Lamp, Coach Painters	₩ ℔ 22 @ 24c
Black Lamp, Ordinary	₩ ℔ c
Black Ivory Drop, fair	12 @ 15c
Black Ivory Drop, best	23c
Black Paint, in oil kegs 8c; asst'd cans, 11c	
Blue Prussian, fair to best	40 @ 50c
Blue Prussian, fair to best, in oil	45 @ 55c
Blue Chinese dry	70c
Blue Ultramarine	18 @ 30c
Brown, Spanish	1½c
Brown, Van Dyke	10 @ 12c
Green, Chrome	15 @ 23c
Green, Chrome, in oil	14 @ 18 @ 25c
Green, Paris good, 20c; best, 25c	
Green, Paris, in oil good, 30c; best, 45c	
Iron Paint, Brigh Red	₩ ℔ 2½c
Iron Paint, Brown	₩ ℔ 1½c
Iron Paint, Purple	₩ ℔ 3 c
Iron Paint, Ground in oil, Bright Red	₩ ℔ 6c
Iron Paint, Ground in oil, Red	₩ ℔ 4½
Iron Paint, Ground in oil Brown	₩ ℔ 5c
Iron Paint, Ground in oil, Purple	₩ ℔ 6 c
Mineral Paints	3 @ 4c
Orange Mineral	12c
Red Lead, American	7c
Red Venetian, Engl sh dry	$1.65 @ $1.7
Red Venetian, in oil asst'd cans, 11c; kegs, 8c	
Red Indian dry	9 @ 12c
Rose Pink	10 @ 12c
Sienna, American, Raw, powdered	3c
Sienna, Burnt, powdered	4½c
Sienna, Burnt, in oil	10 @ 16 @ 20c
Sienna, Raw	11 @ 15 @ 25c
Umber, Burnt, powdered	4 @ 6
Umber, Burnt, in oil	9 @ 12 @ 15
Umber Raw, powdered	3½ @ 7½c
Umber, Raw, in oil	10 @ 15 @ 18c
Vermilion, Chinese	90c
Vermilion, English	46 @ 48c
Vermilion American, Common	15c
White Lead, American, pure dry	6¾ @ 7c
White Lead, American, pure in oil	6½ @ 7c
White, Paris, English, prime in bbls. 2 @ 2	
Yellow Ochre, French	$1.7
Yellow Ochre, French, in oil asst'd cans, 11c; kegs, 8c	
Yellow Ochre, Verona in casks, 1½c	
Yellow Chrome	17 @ 27c
Yellow Chrome, in oil	14 @ 15 @ 25c
Zinc White, American No. 1, dry	6 @ 7c
Zinc White, American No. 1, in oil	9
Zinc White, French, ground dry	8 @ 10c
Zinc White, French, in oil	10 @ 13c

Oils.

Linseed Raw, in casts and bbls	66c @ 67c
Linseed Boiled, in casks and bbls	69c @ 70c
Linseed, Calcutta	58 @ 59c
Bleached Whale	₩ gal. 0c
Bleached Sperm	₩ gal. $1.25
Bleached Elephant	75c
Signal	50c
Prime Lard	64c
No. 1 Extra	55c
West Virginia	8c @ 10c
Drilling	50c
Miners' Oil	45c @ 50c
Fish Oil, pressed	49c @ 51c
Neatsfoot	75 @ 85c
Tallow	7½c @ 7½c
Empire Cylinder Oil	64c
Machinery	40c
Engine	40c

Sundries.

Asphaltum Cuban	5c @ 8c
Asphaltum Egyptian	6½c @ 9c
Benzine	₩ gal. 9c @ 11c
Chalk	80c
Chalk, Block	90c
Dryer, s Patent Am'n asst'd cans, 9c; keg 7c	
Frostings	4 c
Glue, White	24 @ 35c
Glue, Sheet	20c
Glaziers' Points, Zinc	8c
Gum, Copal	35c
Gum, Damar	25c
Gum Shellac, English	40c
Gum Shellac, English, dark	35c
Litharge	7½c
Mineral Wool, ordinary	₩ ℔ 2½ @ 15c
Mineral Wool, extra	₩ ℔ 3 @ 3½c
Pumice Stone, selected Lumps	4 @ 5c
Pumice Stone, Powdered	2½c
Pine Tar, bbls	$2.75
Pitch	$1.9
Putty, in bladders	3c
Putty, in bulk	2½c
Rosin—Common and Good—Strained	$1.9c
E & F	$2.10 @ $2.20
G & H	$2.30 @ $2.5c
I & K	$2.60 @ $2.8c
M & N	$3.00 @ $3.25
Spirits Turpentine	35½ to 36c½
Whiting Spanish	90c
Waste, No. 1 Cop	10c
Waste, No. 1 White Machine	10c
Waste, No. 2 White Machine	9½c
Waste, No. 1 Colored	7c
Waste, No. 2 Colored	6½
Waste, Washed Machine	c

Glass.

Prices current per box of 50 feet.
List, January 17, 1882.

Single Thick.

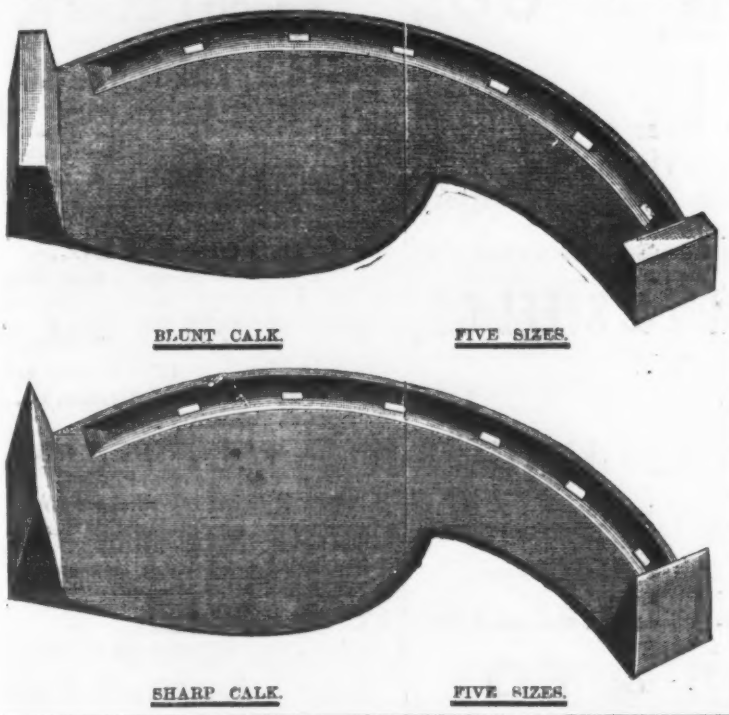
SIZES.	1st.	2d.	3d.	4th
6 x 8 to 10 x 15	$10.00	$ 9.25	$ 9.00	$ 8.4
11 x 14 to 16 x 24	12.50	10.75	10.25	9.5
18 x 22 to 20 x 30	14.75	13.75	12.50	11.4
15 x 36 to 24 x 30	16.50	14.75	13.00	
26 x 28 to 24 x 36	17.50	16.00	14 00	
26 x 36 to 26 x 44	18.75	17.25	14.50	
26 x 46 to 30 x 50	20.50	19.25	16.50	
30 x 42 to 30 x 54	22.75	21.00	18.00	
30 x 56 to 34 x 54	24.00	22.00	19.75	
34 x 58 to 34 x 60	25.25	23.75	21.50	
36 x 60 to 40 x 60	28.50	26.00	23.75	

Double Thick.

SIZES.	1st.	2d.	3d.	4th
6 x 8 to 10 x 15	$13.00	$12.25	$11.75	$11.0
11 x 14 to 16 x 24	15.75	14.75	14.00	
18 x 22 to 20 x 30	20.00	18.50	17.00	
15 x 36 to 24 x 30	22.00	20.00	17.75	
26 x 28 to 24 x 36	24.00	22.50	19.25	
26 x 36 to 26 x 44	25.00	23.50	20.00	
26 x 46 to 30 x 50	27.00	25.25	22.00	
30 x 42 to 30 x 54	30.00	28.00	24.00	
30 x 56 to 34 x 50	31.50	29.00	26.25	
34 x 58 to 34 x 60	33.00	31.50	28.50	
36 x 60 to 40 x 60	37.00	34.00	32.00	

Sizes above—$15 per box extra for every 5 inches. An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 5 inches in length, and not making more than 81 united inches will be charged in the 81 united inches bracket. Discount, 70 to 70 & 5

MOUNT CARMEL OX SHOES,



BLUNT CALK. FIVE SIZES.

SHARP CALK. FIVE SIZES.

With Steel Toe Calks.

WARRANTED

The Best and Cheapest Shoe Made.

SUPERIOR TO ALL OTHERS IN THE FOLLOWING POINTS:

Finished Ready for Nailing On.
Longer and Better Shaped Calks.
Clear Finished Nail Holes.
No Re-Punching Required.
Deep Channel for Nail Heads.
Outwear Any Other Shoe.

Send for Descriptive Price List.

WOODRUFF, MILLER & CO.

MANUFACTURERS,

MOUNT CARMEL, CONN.

LEWIS'S PATENT BELT PROTECTOR

is meeting with a demand entirely beyond all anticipation. The following, however, tells the story of its signal success:

ALBANY ELECTRIC ILLUMINATING CO., ALBANY, April 21, 1883.

Mr. E. S. LEWIS:

Sir.—We are now using your BELT PROTECTORS on several of our belts, and as they give perfect satisfaction, I intend applying them as occasion may require.

Yours, &c., E. A. MAHAR, General Manager.

FOUNDRY FACINGS AND FOUNDERS' SUPPLIES,
ALBANY, N. Y., March 31, 1883.

Mr. EDWARD S. LEWIS:

Dear Sir.—It affords us great pleasure to state that your "BELT PROTECTORS," which were applied to the belts in our mill last fall, have been the means of saving us considerable expense, inasmuch as we should have been compelled to replace them at considerable outlay, whereas now they are in as good condition as when put in, with every prospect of remaining so for a long time to come. E. D. RANSOM & CO.

NEW YORK DEPOT AND AGENCY: **DEWEY MFG. CO., 29 Chambers St.**

SOLE MANUFACTURER AND PROPRIETOR,

EDWARD S. LEWIS,

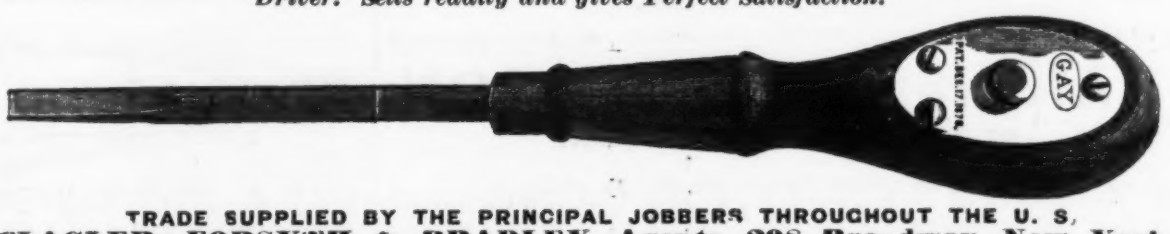
16 Herkimer Street, ALBANY, N. Y.

GAY & PARSONS'

DOUBLE ACTION RATCHET SCREW DRIVER.

ONE OF THE VERY BEST TOOLS EVER INVENTED.

It combines greater Strength, Convenience and Durability than was ever obtained in a Common Driver. Sells readily and gives Perfect Satisfaction.



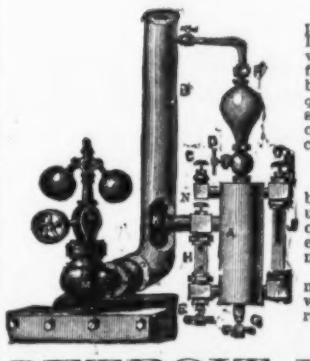
TRADE SUPPLIED BY THE PRINCIPAL JOBBERS THROUGHOUT THE U. S.

FLAGLER, FORSYTH & BRADLEY, Agents, 298 Broadway, New York.

Send for Price List.

THE DETROIT LUBRICATOR COMPANY'S

SIGHT FEED LUBRICATOR CUPS,



For oiling valves and cylinders of steam engines by the only perfect method, THROUGH THE STEAM PIPE. The oil passes IN SIGHT, drop by drop, into the column of steam, where it vaporizes, thus becoming a STEAM LUBRICANT, oiling perfectly every part reached by the steam. Any CLEAN OIL, black or white, light or heavy, may be used. Saves from 25 to 90 per cent. in oil and wear of machinery, thus paying for itself several times a year. A cup will be sent to responsible parties on twenty days' trial if desired. In ordering, give diameter of cylinder.

NOTICE.

The first Lubricators ever made showing the oil passing drop by drop through a transparent water chamber were devised by us, and the same are fully embraced by many Letters Patent owned and controlled by us, which have been sustained in several hotly-contested legal contests. Our customers therefore need have **NO fears in their purchase and use.**

Lubricators of every nature embodying the above feature made by other parties are encroachments upon our rights, and we will hold purchasers and users, as well as manufacturers, responsible in damages for such violation.

Address,

DETROIT LUBRICATOR CO.,

129 Griswold Street, DETROIT, MICH.

NOTE.—In our suit against the American Lubricator Co., of Detroit, before Justice Stanley Matthews, of the U. S. Supreme Court, involving their "Sight-feed" feature, a decree was rendered in our favor August 20, 1881.

Mention *The Iron Age*.

G. A. CROSBY & CO.,

259 & 261 Randolph St.,

CHICAGO, ILL.,

Manufacturers of all kinds of

Power, Screw, Hand, Foot and Drop

PRESSES,

DIES,

And Special Tools for Tin Can Makers and Sheet Metal Workers.

Send for Catalogue and Price List.

20,000 Sold the Second Year.

THE BEST ADJUSTABLE BAG HOLDER In the World.

PRICE ONLY $1.50.

Sent free, on receipt of the price, anywhere in the United States.

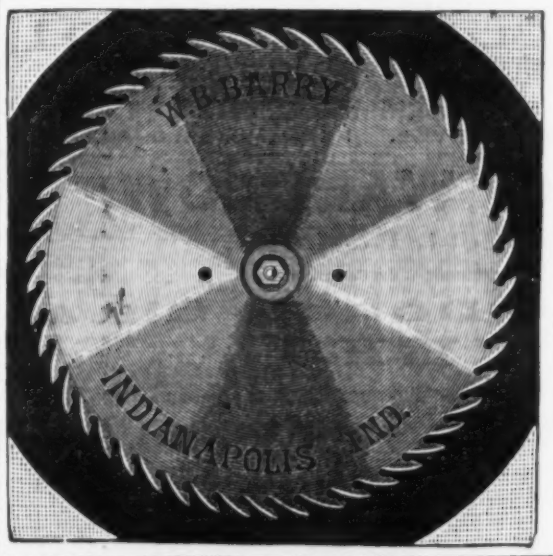
Just the thing for the Farmer, Thresher, Miller, the Feed Store Grain, Potato, Guano and Phosphate dealers, Postmasters and Publishers, and to all others who use Sacks or Bags it is indispensable. A perfect and simple device, made of iron and will last a life time. Sold by the Hardware trade everywhere. Orders solicited. The platform is extra if wanted. Agents wanted everywhere. Address

L. JEFF. SPRENGLE
Sole Manufacturer,
Ashland, Ohio.

None can do without it for $1.50. Send for circular. Special discount to the trade.

Will furnish a sample dozen to the trade during the month of January at the low price of $9.

HOOSIER SAW WORKS.



W. B. BARRY,

Saw Manufacturer,

132 & 134

South Pennsylvania St.,

INDIANAPOLIS, IND.

Swages, Gummers, Files, Belting and Emery Wheels.

ALL WORK FULLY WARRANTED.

Established 1855. KEYSTONE WORKS. *Centennial Award 1876.*

GEORGE GRIFFITHS,

MANUFACTURER OF

PATENT SOLID CAST STEEL

Shovels, Spades and Scoops.

Also COAL HODS, &c.

Nos. 511, 513 and 515 LOCUST ST.,

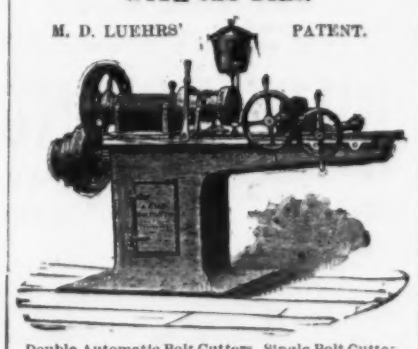
PHILADELPHIA, PA., U. S. A.

Send for Price List.

"ACME" BOLT CUTTERS

WITH CAP DIES.

M. D. LUEHRS' PATENT.



Double Automatic Bolt Cutters. Single Bolt Cutters, ¼ in. to 4 in. Rapid Bolt Cutters. Nut Tappers, ½ in. to 1¼ in. Rapid Nut Tappers, 3, 4 and 5 Spindles. Bolt Headers, four different styles. Bolt Pointers. Nut Presses, &c.

NOVELTY IRON WORKS

CLEVELAND, OHIO.

THE RICHARDS HOUSE-DOOR HANGER

FOR SLIDING DOORS.

They are simple to hang, massive and strong, without a single weak point. Adaptable to all widths of doors from two to twelve feet, single or double, and require no track on the floor. The only absolutely anti-friction top hanger in the market. There are no plates to mortise in; no matching of hardware, and no defacing of doors. The trade are required to carry but one size in stock, the run being about forty inches longer than the largest sheave upon the market. Every set guaranteed. Write for quotations.

MANUFACTURED BY

WILCOX MFG. COMPANY,

AURORA, ILL.

THE

DEXTER CARRIAGE SPRING

Combines Strength, Durability, Beauty. | It is Graceful, Noiseless, Light and Easy.

The **DEXTER SPRING** is the most perfect Carriage Spring ever invented. Wherever it is known it is rapidly superseding all others for pleasure vehicles. It is especially recommended for use on the rough roads of new countries, as its peculiar construction relieves the strain on the vehicle and shock to the passenger, while the high grade of material used reduces the probability of breakage to a minimum.

For circulars, prices, &c., address

DEXTER SPRING CO., Hulton, near Pittsburgh Pa., U. S. A.

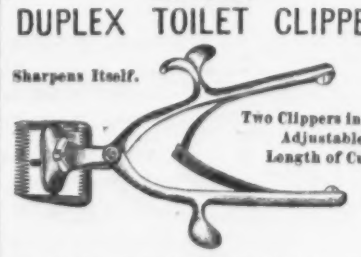
Just What Was Wanted!

PHIPPS & BURMAN'S

NEW PATENT

DUPLEX TOILET CLIPPER.

Sharpens Itself.



Two Clippers in One. Adjustable Length of Cut.

Write for circular and prices of all of Phipps & Burman's Reversible, Self-Sharpening and other Horse and Barber Clippers.

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37 South 4th St., Philadelphia, U. S. A.

BARNES' NEW STORE DOOR LOCK.

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PREPARED HOUSE PAINTS

READY FOR USE.

BILLINGS, TAYLOR & CO.,

CLEVELAND, OHIO,

Color Makers, Varnish Makers,

AND

PAINT MANUFACTURERS.

Send for Sample Card and Catalogue.

Becker's Patent Washing Machine, Improved.

Approaches nearer the old method of hand rubbing than any device yet introduced to the public. Easily worked and washes perfectly clean. Descriptive circular and price list mailed free.

N. C. Baughman, YORK, PA.

ESTABLISHED IN 1859.

THE IRONMONGER AND METAL TRADES ADVERTISER

PUBLISHED EVERY SATURDAY.

THE OLDEST AND CHIEF REPRESENTATIVE OF THE IRON, HARDWARE AND METAL TRADES.

OFFICE: 42a CANNON STREET, LONDON, E. C.

ADVERTISEMENTS AND SUBSCRIPTIONS ARE RECEIVED AT THE VARIOUS OFFICES OF "THE IRON AGE," NAMELY:

NEW YORK OFFICE: DAVID WILLIAMS, Publisher of *The Iron Age*, 83 Reade street, who will, on receipt of application, supply specimen copies free.

PITTSBURGH OFFICE: 77 Fourth Avenue—JOS. D. WEEKS, Manager and Associate Editor.

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Notes of Novelties.—This is a department of the journal always watched with interest by the trade, as it contains an account, from week to week, of the novelties which manufacturers and inventors are introducing to the notice of the trade. These articles are freely illustrated.

Special Correspondents.—The *Ironmonger* has a deserved reputation for its special correspondence from all the principal Continental, British and manufacturing centers. The writers are gentlemen holding important positions in the districts with which they are connected, and possess facilities for acquiring information specially suited for the columns of the *Ironmonger*. *The Week. Legal Notes. Trade Notes. Bankruptcies, Foreign Notes. Colonial Jottings. Merchants' Circulars, &c*, are each departments of the journal containing a digest of all matters of direct interest to the Iron, Hardware and Metal Trades. In addition to the above, there is a carefully classified list of Patents, together with Editorial Notes, French, Belgian and other Special Correspondence.

SUBSCRIPTIONS

to the *Ironmonger and Metal Trades' Advertiser*, with which is sent every fourth week the Foreign Supplement (see below), may commence from any date, but are not received for less than a year complete. The rate is $5 per annum, inclusive of postage to any part of the world outside Great Britain. To every subscriber is presented, free, in the course of his year, a handsome and useful ***Ironmongers' Diary and Text Book,*** a work sold to non-subscribers at 75 cents.

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One Advertisement of every Series of 13 Monthly, 27 Fortnightly, or 53 Weekly, will be inserted in the Ironmongers' Diary and Text Book, published toward the end of each year, and presented to every Subscriber.

	53 INSERTIONS, each net.	27 INSERTIONS, each net.	13 INSERTIONS, each net.	7 INSERTIONS, each net.	3 INSERTIONS, each net.	1 INSERTION, net.
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One-sixteenth page	2.00	2.25	2.50	3.00	3.50	5.00

SPECIAL ISSUES.

In the spring and autumn, of each year there is published a special issue, the circulation of which is not less than **Twelve Thousand (12,000)** copies

THE IRONMONGERS' DIARY AND TEXT BOOK.

This is an annual, **presented free to every Subscriber to the IRONMONGER AND METAL TRADES' ADVERTISER.** It contains a large number of ruled skeleton pages for diary and other entries, and in addition much useful reference information, varied from year to year. It is handsomely bound in cloth, gilt; and as copies are used in thousands of establishments for a whole year, it is obviously a medium of exceptional value for advertisements. Sold to non-subscribers at 75 cents.

THE FOREIGN SUPPLEMENT,

With which is incorporated The Universal Engineer,

is published every fourth week in connection with the extensive and world-wide circulation of the *Ironmonger* itself. The dates of its publication for next twelve months will be as follows:

JUNE 23, JULY 21, AUGUST 18, SEPTEMBER 15, OCTOBER 13, NOVEMBER 10, DECEMBER 8, 1883, JANUARY 5, FEBRUARY 2, MARCH 1 and 29, and APRIL 26, 1884.

This supplement is published in

FOUR LEADING COMMERCIAL LANGUAGES

of the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the *Ironmonger* not only with reach, but in the native language of eighty millions of *German*, twenty eight millions of *Italian*, and fifty-one millions of *Spanish* speaking people; or, all, over two hundred millions of inhabitants in the principal nations where the best purchasers of manufactured goods are to be found.

Advertisements are inserted in *any* language at the following

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Half page	17.00	19.15	21.25	One-eighth page	6.20	7.00	7.75
One-third page	12.50	14.10	15.65	One-sixteenth page	3.20	3.40	4.00

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THE WHOLE FOREIGN HARDWARE TRADE,

so far as our experience of more than twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or Advertisement inserted in the *Ironmonger* and FOREIGN SUPPLEMENT is a strikingly powerful and most efficient way of publicity, not to be compared with any of the other ordinary channels of communication.

HENRY DISSTON & SONS,

KEYSTONE SAW, TOOL, STEEL & FILE WORKS,

Front and Laurel Streets, PHILADELPHIA.

SKEW-BACK SAWS.

D8 HAND SAW.

This Saw has all the latest improvements in Hand Saws, and is warranted superior to all others, and is giving entire satisfaction.

We call the attention of the trade to our new styles of

COMMON HAND SAWS,

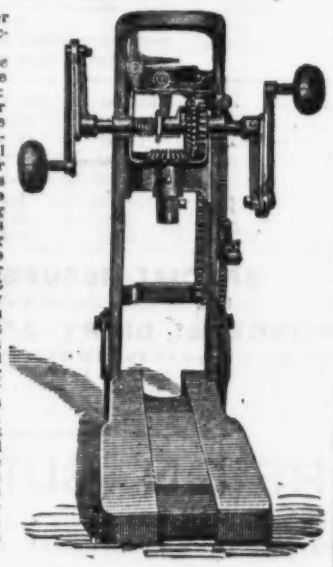
the *cheapest* in the market. We are also offering

SUPERIOR CROSS-CUT SAWS

FOR THE FALL TRADE.

☞ *Send for Price List.*

SAUNDERS' PATENT
AUTOMATIC BORING MACHINES
FOR BUILDERS' AND FRAMERS' USE,



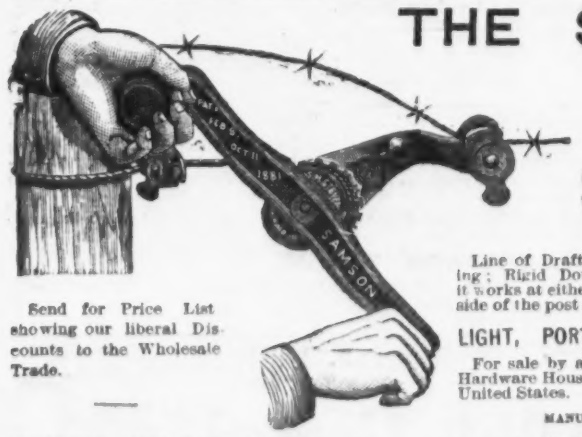
are universally acknowledged to be superior to all other *Boring Machines*, and we *guarantee* to give better *satisfaction* than any other machine.

Ship Builders, House Builders, Dock Builders, Bridge Builders, Carpenters and *Farmers* please notice what we claim for our machine, and we guarantee all thatwe claim: First, that it will do nearly double the work of any other machine in the same length of time, with greater ease to the operator; that we can regulate the speed of the bit according to the size of the same, or to suit the operator; it will drive the bit any required speed; it will drive the bit or auger to any required depth, and the bit or auger returns from the hole by the same automatic motion without the operator stopping the machine; at the same time clearing itself and leaving the hole entirely free from chips; it is gauged to bore such a depth as may suit the operator, boring two or more holes at exactly the same depth after being once set, without any attention from the operator; it is an angular machine and will bore on any angle; it is the most compact machine; it can be placed in so small a compass as to occupy but little room in a carpenter's tool chest, and while in this compact form it can be carriedin the hand with the greatest ease and convenience; it is the most durable machine, from the fact that we use the best material in its construction, and each part can be duplicatedin case of accident by sending directly to us. We finish the ironwork with a baked or heated Japan finish which enables it to withstand all kinds of weather, the woodwork being rubbed in oil and shellaced. They are the cheapest Boring Machines in the world for what they can do. We are introducing the Gladwin Improved Auger in connection with this machine. This auger is the best Boring Machine Auger made, being a self-clearer in gummy or knotty wood. We offer the Borer, boxed and delivered on board cars, for $6. with full set Gladwin improved Augers, 18 qrs., $9; or with extra finished beds, $6.50, and full set augers, 18 qrs., $9.50. A discount given for large orders. Send for Descriptive Catalogue.

THE W. B. WELLS MFG. CO., Ashaway, R. I.

FOR SALE BY

LOUDERBACK GILBERT & CO., 33 Chambers St., New York.
TALLMAN & McFADDEN, 607 Market Street, Philadelphia.
BUHL, SONS & CO., Detroit, Mich.
A. W. BINGHAM & CO., Cleveland, Ohio.
GORDON HARDWARE CO., San Francisco, Cal.
HODGE & HOMER, 47 Randolph Street, Chicago, Ill.



THE SAMSON
is the Best, the Simple and most Portable
WIRE STRETCHER
in the Market.

Line of Draft direct; always Self-Adjusting; Rigid Double Handle; Double Pawl; it works at either end of the fence, at either side of the post and either side up.

LIGHT, PORTABLE, SIMPLE, SURE.

For sale by all leading wholesale Jobbing Hardware Houses and Barb Wire men in the United States.

MANUFACTURED ONLY BY

Send for Price List showing our liberal Discounts to the Wholesale Trade.

SAMSON NOVELTY WORKS, Nos. 14 & 16 Main St., De Kalb, Ills.

AND IN CANADA BY

BULLOCK HARDWARE CO., Otterville, Ontario.

WROUGHT IRON TACKLE BLOCKS,
Swivel Hooks for Rope or Chain,
POLISHED GROOVES, ALL SIZES IN STOCK.
Also Pulley Blocks for Wire Rope,
Headquarters for the
RVING BRAND WOODEN PULLEY BLOCKS,
McCOY & SANDERS, Manuf'turers,
26 Warren Street, New York.

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119 South Fourth Street,
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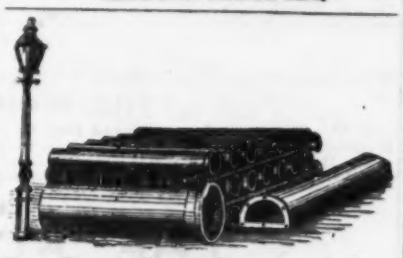
H. HOWSON, Engineer and Solicitor of Patents.
C. HOWSON, Attorney at Law and Counsel in Patent Cases.
SEND FOR CIRCULARS.



R. D. WOOD & CO.,
Philadelphia,
Manufacturers of
Cast Iron Pipe
FOR WATER AND GAS,
Lamp Posts, Valves, &c.,
Mathew's Pat. Anti-Freezing Hydrants
400 CHESTNUT STREET.

ONONDAGA PATENTED ROAD SCRAPER.

The BEST and CHEAPEST in the WORLD. We not only guarantee it a good scraper, but can safely say it has no equal. Price, $25. Liberal discount to agents. Send for circulars. Address

F. G. AUSTIN,
BOX 293. Skaneateles, N. Y.

LEVER
Lemon Squeezer,
With perforated strainer. It will squeeze one-third more juice from a lemon than any other; also quicker and more durable than any other.

R. ONDERDONK.

Best, Cheapest and Fastest Selling
POTS
On the Market.
Send for discounts.
R. C. PURVIS,
407 CHERRY ST.,
Philadelphia.

MACHINERY FOR
Straightening and Cutting Wire
Of all Sizes to any Length.
Send for Catalogue.
JOHN ADT,
New Haven, Conn., U. S. A.

Prouty's Patent PEERLESS FORCE PUMP.

Has Self-Adjustable Foot Rest.

NEW AUTOMATIC COMPENSATING PACKING.

It will throw a continuous jet FROM FORTY TO SIXTY FEET. A new pattern jet and spray nozzle is sent with each pump.

Especial attention is called to the material and workmanship exhibited in these pumps.

LIST PRICE, $8.

THE NEW ENGLAND BUTT CO.
PROVIDENCE, R. I.
NEW YORK OFFICE, 99 Chambers St.

THE AMERICAN BOLT AND SCREW CASE CO.,
DAYTON, - - - OHIO.
MANUFACTURERS OF
REVOLVING BOLT AND SCREW CASES.

We are the only manufacturers of Bolt cases and the only parties who make lists of Bolt or Screw Cases to suit stock of purchaser without extra charge. All goods guaranteed. Send for Illustrated Circular.

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We are also extensive manufacturers of **Fruit Can Sealing Wax.** Send for Circulars and Prices.

Very Respectfully,

THE AMERICAN BOLT & SCREW CAS .CO.

MORSE TWIST DRILL AND MACHINE CO.
NEW BEDFORD, MASS., Sole Manufacturers of
Morse Patent Straight-Lip Increase Twist Drill,
Beach's Patent Self-Centering Chuck, Solid and Shell Reamers,
BIT STOCK DRILLS,

DRILLS FOR COES, WORCESTER, HUNTER AND OTHER HAND DRILL PRESSES. BEACH'S PATENT SELF-CENTERING CHUCKS, CENTER AND ADJUSTABLE DRILL CHUCKS, SOLID AND SHELL REAMERS. DRILL GRINDING MACHINES. TAPER REAMERS, MILLING CUTTERS AND SPECIAL TOOLS TO ORDER.

All Tools exact to Whitworth Standard Gauges.

GEO. R. STETSON, Supt. EDWARD S. TABER, Treas.

BEECHER & PECK

Successors to Milo Peck, Manufacturers of
PECKS DROP PRESS

PECK'S DROP LIFTER is the only one which has its parts cushioned. Being thus cushioned they are the most durable Lifter in the market.

Can be attached to any drop now in use.

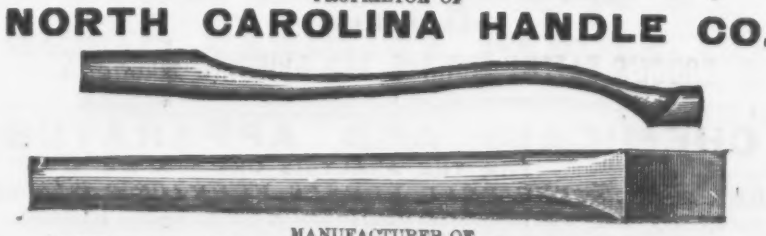
Send for Illustrated Catalogue.

Cor. Lloyd and River Sts. **New Haven, Conn.**

MATTHIESSEN & HEGELER ZINC COMPANY,
LA SALLE, ILLINOIS,
MANUFACTURERS OF
Refined Spelter, Sheet Zinc and Sulphuric Acid.

ALL ORDERS FILLED PROMPTLY.

V. G. HUNDLEY,
PROPRIETOR OF
NORTH CAROLINA HANDLE CO.



MANUFACTURER OF
Handles and Spokes,
70 Reade Street and 97 Chambers Street, ... NEW YORK.
HARDWARE COMMISSION MERCHANT.

PHILADELPHIA.

Corrected Weekly by Lloyd, Supplee & Walton.)

Terms, 30 days. For 60 or 90 days, interest added at 10% per cent. per annum.

Anvils.
Peter Wrights, ₩ ℔.....11 @ 11½c
Over 200 lbs.....11½c
Trenton.....10½
Eagle Anvils, American, 10c.....dis 20 %

Apple Parers.
Globe Apple Pearers.....$6.00 net
Penn Apple Parers.....$6.00 net
Lots of 10 to 20 dozen special prices

Bay State Peach Parer.....$9 00

Axes.
Hunt's Kentucky and Yankee, per doz.....$8.50 @ 9.00
Robert Mann.....$8.00 @ 8.50
Richland Chief.....$7.50 @ 8.00
Beveled Axes.....add 500 net
Double Bit Axes.....net $14.50 @ 15.50

Augers and Auger Bits.—New List January 7, 1880.
Bates' Nut Augers.....dis 45&10 %
Cook's Augers.....dis 40&10 %
Watrous' Ship Augers.....dis 15 %
Benjamin Pierce Auger Bits.....dis 40 %
Griswold Auger Bits.....dis 45&10 %
Cook's " .....dis 40&10 %
Jennings' " .....dis 10, 10&10 %
Bonney's Pat. Hol. Augers, list $48 ₩ doz..dis 25&10 %
Stearns' Pat. Hol. Augers, list $48 ₩ doz..dis 20&10 %

Balances.
Light and Common.....dis 15&10 %

Bells.
Bevin Bros. Mfg. Co. Light Hand Bells.....dis 70 %
Swiss Pattern Hand Bells.....low list dis 40&10 %
Connell's Door Bells.....dis 15 & 10 %
Gt. Western & Kentucky Cow new list.....dis 60 %

Boring Machines
Upright, without Augers.....List 5.50 } dis 45@50 %
Angular, without Augers.....“ 6.75 }

Bolts.—Eastern Carriage Bolts.....dis 80 @ 80 & 10 %
Philadelphia “ .....new list dis 70&10 %
Stanley, Wrought Shutter.....dis 60&10 %

Braces.—Barber's.....dis 40&5 %
Backus.....dis 50 %
Spofford.....dis 50&5 %
American Ball.....dis 55 %

Butts.—Cast Fast Joint, Narrow.....dis 45&10 %
“ “ Broad.....dis 45&10 %
Cast Loose Joint, Narrow.....dis 55&10 %
“ “ Broad.....dis 55&10 %
“ Acorn, Loose Pin.....dis 50&10 %
“ “ Jap'd.....dis 60&10 %
“ Mayer's Loose Joint.....dis 60&10 %
Wrought Loose Pin.....dis 55&10 %
“ Table Hinges and Back Flaps..dis 40&10 %
“ Narrow, Fast.....dis 50&10 %
“ Loose Joint.....dis 55&10 %

Blind Butts.
Parker.....dis 70 & 2 %
Clark.....dis 70 & 2 %
Shepard.....dis 70 %
Lull & Porter.....dis 70&10 %
Huffer's.....dis 50 %

Chains.—German Halter and Coil, list December 31, 1881.....dis 45&5 0 %
Galvanized Pump.....₩ ℔ 9½c net
Best Proof Coil Chain—English.

₩ ℔	13	10	8½	7½	7¼	7	gold
	9-16	¼	5-16	⅜	7-16	½	in.

Chisels.—Socket Framing.....dis 65&10 %
Socket Firmer.....dis 65&10 %
Butcher's.....$6.00 to £ gold

Casters.—Bed (new list July 1, 1880,).....dis 45@50 %
Plate.....dis 40@50 %

Coffee Mills.—Box and Side, new list Jan. 1, 1880.....dis 45 %
Enterprise.....dis 25 %
Cutlery.—Walden Pocket.....new list net
Penna. Knife Co.....new list net
Landers, Frary & Clark, J. Russell & Co., Lamson & Goodnow Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices net.

Drawing Knives.
Hart Mfg. Co.'s.....dis 65&10 %
Adjustable Handle.....dis 20 %

Fry Pans.
Tinned.....dis 45 %

₩ doz.	$3.40	4.00	4.50	5.00	5.50	6.50	7.50	9.00	10.00
No....	0	1	2	3	4	5	6		8

Burnished.....dis 60, 10 & 5 %

₩ doz.	$3.00	3.75	4.25	4.75	5.25	6.00	7.00	8.00	9.00
Fo....	0	1	2	3	4	5	6	7	8

Files.
Nicholson.....dis 50 %
Disston.....dis 50 %
Butcher.....

Fluting Machines.
Eagle—3½ in. roll.....each, $2.15 } dis 25 %
“ —4½ in. roll.....“ 2.85 }
Crown—4½ in. roll.....“ 3.50 }
“ —6 in. roll.....“ 4.00 } dis 25 %
“ —8 in. roll.....“ 6.50 }
Geneva Fluter.....dis 25 %
Favorite com. Fluter & Sad Iron.....₩ doz $10.50 net

Hammers.
Yerkes & Plumb's, new list.....dis 30 %
Maydole Hammers.....dis 15 %
Howell A. E. Nail Hammers.....per doz. net $3.75

Handles.
Disston Loop Handles Crosscut.....33c pair net
Boynton Loop Handles Crosscut.....43c pair net

Hatchets.
Yerkes & Plumb, new list.....dis 30 %
Hunt.....dis 25 %

Hinges.
Strap and T.....dis 65 & 10 %

Horse Nails. Nos. 4 5 6 7 8 9 10

Globe	24	21	19	18	17	16	dis 12½ %
Vulcan	26	25	21	20	19	18	dis 12½ %
Ausable	30	27	25	24	23	22	dis 20&10 %
“ Polished and Pt'd & Blued & P't'd	31	28	26	25	24	23	dis 30&10%
Clinton	24	21	20	19	18	dis 40&10%	
“ Polished & Pointed	24	22	21	20	19	dis 30&10%	

Hay and Straw Knives.
Lightning.....per doz, net $18.00
Electric.....“ “ 15.00
Wadsworth.....“ “ 10.50
Walton Straw Knives.....“ “ 17.00

Locks and Knobs.
Branford.....new list dis 45, 10& 2 % cash
Gaylord Cabinet.....dis 25&2 % cash
American Padlocks.....dis 30, 10&2 % cash
Scandinavian Padlocks.....dis 50 %

₩ doz.	$5.00	5.50	6.50	7.50	8.50	10.00	12.50	} dis 60 %
No.....	47	58	59	60	61	62	63	
₩ doz.			$18.00		26.00		33.00	} dis 60 %
No.			64		65		66	

Lanterns.
Buckeye.....Large list net; small list net
Tubular.....No. 0, $8.65; No. 1, $10.15 ₩ doz net
Guards, 35 cents extra per doz. net.

Lawn Mowers.—Pennsylvania.....} new list
Philadelphia.....} dis 30 %
Excelsior.....}

Lawn and Garden Pumps.
Roland Patent.....List $8.00 dis 10 %

Mattocks.
Long and Short Cutter.....new list....45 %
Pennsylvania Pattern.....dis 4 %

Molasses Gates.
Enterprise Mfg Co.'s Measuring Faucets.....dis 25 %
Stebbins' Gates.....dis 70&10%
Lincoln's “ .....dis 60&10 %
Landers, Frary & Clark's Petroleum.....dis 20&10 %
Brass Liquor Cocks, new list Jan. 1 1882.....dis 45 %
Cork Lined “ .....dis 70 %

Meat Cutters.
Dixon's.....dis 25&5 %
Woodruff.....dis 25&5 %
Stowe.....dis 25&5 %
Hale's.....new list, dis 50, 10&2 cash
American.....dis 25 %
Stuffers.....dis 25&5 %
Enterprise Stuffers.....dis 25 %

Pianos.—Sandusky Tool Co.....dis 20 %
Ogonts.....dis 25 %
Ohio & Auburn.....dis 20 %
Bailey (S. R. & L. Co.).....dis 20&10 %

Piano Irons.—Ohio Tool Co.....dis. 20 %
Butcher's.....$4.00

Plumbs and Levels.
Stanley's Adjustable.....dis 65&10 %
“ Non-Adjustable.....dis 65&10 %

Picks.—New list.....40 %

Razor Straps.
Lamont Combination.....per doz. $4.00
“ “ .....1 gross lots $42.00
Imitation Emerson.....per doz. 2.00

Rules.—Stanley Boxwood.....dis 70 &10 %
Stanley Ivory.....dis 55&10 %

Steelyards.—Hart's Pattern.....dis 33½&10 %

₩ doz.	$14.40	17.75	21 00	26.50	31 00	35.50
Lbs.....	50	100	150	200	250	300

American Pattern.....dis 33½&10 %

₩ doz.	$8.00	10.25	13.75	15.00	16.75	19.50
Lbs.....	50	100	150	200	250	300

Squares.
Steel and Iron...dis 50; full case, dis 50&10&2 for cash
Try Squares, Stanley.....dis 65&10 %
Disston's Try Squares.....dis 40 %

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened.....₩ doz $9.00
Clipper No. 10, Bronzed Blade, Boxed and Sharpened.....₩ doz $8.50
Clipper No. 5, Painted Red, Boxed and Sharpened.....₩ doz $8.00 } 30

Saws.—Disston's Hand, Panel and Rip.....dis 20 %
Disston's Circular.....dis 40 %
Cross-Cut No. 2, Plain Tooth.....dis 40%
“ Patent Tooth.....dis 40%
“ Champion Tooth.....dis 40%
Boynton's Lightning Cross Cut, new list.....dis 40 %
“ Lightning Buck Saws, cross bar.....dis 40 %

Shovels and Spades.
Oliver Ames & Sons, new list.....dis 15 %
Grimths.....dis 50&5&2&5
Rowland.....dis 50&5&2&5
Sad Irons.—4 to 10 lbs.....₩ ℔ 3½c
Mrs. Potts' Patent.....dis 35 %

Stone.
Washita Extra.....₩ ℔ 28c net
“ No. 1.....“ 18c
“ No. 2.....“ 10c
“ Slips.....“ 37c
“ Axe.....“ 130 net
Hindostan Oil Stone No. 1.....₩ ℔ 50 } dis 33½ %
“ Axe Stone.....“ 80 }
“ Slips.....“ 10c }

Screws.
Flat Head Iron, new list Dec. 27.....dis 40 & 10%
Flat Head Brass, new list Dec. 27.....dis 30 & 5 %
Round Head Brass, new list Dec. 27.....dis. 40 & 10 %
Round Head Iron, new list Dec. 27.....dis. 40 & 10 %

Screws.
Flat Head.....dis 40 & 10 %
German Silver.....dis 30 @ 10 %
Britannia, Boardman's.....dis 60 %
“ Parker's.....dis 60&10 %
Tinned.....dis 10 %

Springs.—Torrey.....dis 10 %
Gem No. 3 small Jap'd.....$2.00 } dis 50 & 10 %
“ No. 2 medium Jap'd.....2.75 }
Coil No. 70, per gross net.....$6.00
Other Standard Springs.....dis 50&10 %
Warner Door Springs, per doz. net.....1.75
Standard Spring Hinges—
Single No. 0, per doz. net.....1.25
“ No. 1, “ “ 1.50
Other Standard Spring Hinges.....dis 50&10 %

Stocks and Dies......dis 10&5 %

Stove Polish.—Gem.....₩ gross, $4.50, dis 5 %
Dixon.....0.00, dis 10%
Fire Fly.....$3.00 gross net

Tacks......dis 30&10 %
Shoe Nails—4-8, and over 8c..... } 10 %
“ “ 3½-8, and under 9c..... }
Double Pointed Tacks.....dis 50&5 %

Traps.
Genuine Oneida—Newhouse.....dis 35 %
Im. Oneida—Newhouse list, first qual.dis 55&5 @ 60 %

Vises.—Solid Box, Trenton new list.....dis 35 %

Wrenches.—Agricultural.....dis 70 %
Coes' Genuine.....dis. 50&5 %
Coes' Mechanics'.....dis. 50&10&5 %
“ “ Mail. Bar.....dis 75 %

Wire.
Bright or Ann'd, No. 0 to 18.....dis 52½ to 55 %
“ No 19 to 26.....dis 60 to 62½ %
“ No. 27 to 36.....dis 60 to 67½ %
Coppered, 0 to 18.....dis 47½ to 50 %
Tinned Broom Wire.....dis 55 to 57½ %
Galvanized Barb Wire.....90cts
Painted Barb Wire.....80
Galvanized No. 7 to 18....Market List, dis 42½ to 45 %

Wringers.
Peerless No. 2½.....$42.00
“ No. 2.....45 00
Universal No. 2½.....42.00
“ No. 2.....45.00
Novelty No. 2, for common tubs.....42 00
“ No. 3, “ “ 48.00
Excelsior E, for stationary tubs.....51.00
“ F, “ “ 57 00

In lots of 1 doz. $3.00 doz. dis. from above price.

PITTSBURGH.

Merchant Iron.

TERMS.—Note or acceptance at 60 days, with current rate of exchange on New York, or a discount of 2 per cent. for cash, if remitted within 10 days from date of invoice.

For fluctuations and discounts on card rates see weekly Pittsburgh Trade Report.

The following are card rates.

Flat Bar.

1½ to 4 by ⅜ to 1 inch.....2.5c
1½ to 6 by ⅜ to 1 “ 2.6c
1¾ to 6 by 1¼ to 1½ “ 2.9c
1½ and 1¾ by ⅜ to ¾ “ 2.6c
1 and 1¼ by ⅜ to ¾ “ 2.7c
⅝, ¾ and ⅞ by ⅜ to ⅝ inch.....3.0c

Rounds and Squares.

1 to 1⅞.....2.5c | ⅜ to 9-16.....2.7c
2 to 2¾.....2.7c | ½ to 7-16.....2.9c
2¾ to 3¼.....3.0c | ⅝.....3.1c
3¼ to 4.....3.5c | 5-16.....3.3c
4¼ to 5.....4.0c | ¼.....3.5c
⅞ to ⅞.....2.0c | 9-16.....3.5c

Oval Iron.

⅞ to 1⅜.....2.9c | ⅜.....3.3c
⅛ to ⅞.....3.1c | ⅞.....3.7c

Half Oval and Half Round.

1¼ to 1¾ inch.....3.2c | ¼ inch.....4.0c
1⅛ to ⅞ “ .....3.7c | ⅜ “ 5.5c

Horse Shoe.

⅜ to 1¼ by 5-16 to ⅜ inch.....3.4c

Wagon Box Iron.

⅜ Inch, Nos. 13 and 14.....3.7c
⅜ “ “ 11 and 12.....3.5c
⅜ “ “ 13 and 14.....4.0c
⅜ “ “ 11 and 12.....3.8c
⅜ “ “ 13 and 14.....4.1c
⅜ “ “ 11 and 12.....4.1c

Heavy Bands.

1¼ to 6 by ⅜ and 5-16 inch.....2.7c
1¾ to 3¼ by ¼ and 5-16 “ 2.7c
1 to 1¾ by ¼ and 5-16 “ 2.7c
⅜ to ⅝ by ¼ and 5-16 “ 3.0c
⅝ and ⅞ by ¼ and 5-16 “ 3.5c

Light Bands.

1¼ to 6 by ⅛ to 3-16 .....3.4c
1¾ to 6 by Nos. 11 and 12.....3.1c
1 to 1¾ by 3-16.....3.1c
1 to 1¾ by Nos. 11 and 12.....3.3c
⅜ and 13-16 by ⅛ to 3-16.....3.4c
⅜ and 13-16 by Nos. 11 and 12.....3.5c
⅝ and 11-16 by ⅛ to 3-16.....3.7c
⅝ and 11-16 by Nos. 11 and 12.....3.8c
⅝ and 9-16 by ⅛ to 3 16.....3.9c
⅝ and 9-16 by Nos. 11 and 12.....4.1c
⅞ inch by ⅛ and 3-16.....4.3c
⅞ inch by Nos. 11 and 12.....4.4c

Hoop Iron.

1¼ to 4, Nos. 13, 14 and 15.....3.3c
1¼ to 2, Nos. 16, 17 and 18.....3.4c
1¾ to2, No. 19.....3.5c
1¼ to 2, No. 20.....3.6c
1¼ to 2, No. 21.....3.7c
1¼ to 2, No. 22.....3.8c
1⅛ to 1, and 1¼, Nos. 13, 14 and 15.....3.5c
1⅛ to 1, and 1¼, Nos. 16, 17 and 18.....3.6c
1⅛ to 1, and 1¼, Nos. 19 and 20.....3.7c
1⅛ to 1, and 1¼, No. 21.....3.8c
1⅛ to 1, and 1¼, No. 22.....3.9c
⅞, Nos. 13, 14 and 15.....3.7c
⅞, Nos. 16, 17 and 18.....3.8c
⅞, Nos. 19 and 20.....3.9c
⅞, No. 21.....4.0c
⅞, No. 22.....4.1c
1⅛ to 1⅜ Nos. 13, 14 and 15.....3.9c
1⅛ to 1⅜, Nos. 16, 17 and 18.....4.0c
1⅛ to 1⅜, Nos. 19 and 20.....4.1c
1⅛ to 1⅜, No. 21.....4.2c
1⅛ to 1⅜, No. 22.....4.3c
1¼, Nos. 13, 14 and 15.....4.0c
1¼, Nos. 16, 17 and 18.....4.1c
1¼, Nos. 19 and 20.....4.2c
1¼, No. 21.....4.3c
1¼, No. 22.....4.4c
1⅜ to 1½ Nos. 13, 14 and 15.....4.2c
1⅜ to 1½, Nos. 16, 17 and 18.....4.3c
1⅜ to 1½, Nos. 19 and 20.....4.4c
1⅜ to 1½, No. 21.....4.5c
1⅜ to 1½, No. 22.....4.6c
1½, Nos. 13, 14 and 15.....4.4c
1½, Nos. 16, 17 and 18.....4.5c
1½, Nos. 19 and 20.....4.6c
1½, No. 21.....4.7c
1½, No. 22.....4.8c
1½, No. 23.....4.9c
9-16, Nos. 13, 14 and 15.....4.6c
9-16, Nos. 16, 17 and 18.....4.7c
9-16, Nos. 19 and 20.....4.8c
9-16, No. 21.....4.9c
9 16, No. 22.....5.0c
9-16, No. 23.....5.1c
⅝ inch, Nos. 13, 14 and 15.....4.8c
⅝ “ Nos. 16, 17 and 18.....4.9c
⅝ “ Nos. 19 and 20.....5.1c
⅝ “ No. 21.....5.3c
⅝ “ No. 22.....5.3c
⅝ “ No. 23.....5.4c

The prices under Hoop Iron do not apply to Cotton Ties.

1-10c per lb. extra will be charged for each gauge lighter than the lightest indicated.
1-10c per lb. extra will be charged for cutting Hoops to specified lengths.

Barrel Hoops.

1¼ to 2 in., cut to length.

9 to 11 lbs, per set of 6 hoops.....3.5c
8 lbs. and less than 9 lbs. per set of 6 hoops.....3.6c
Less than 1lbs. per set of 6 hoops.....3.8c

Extras for Cutting to Length all Preceding Iron.

All Iron, including Tire.....1.10c

Tank Iron.

No. 9 and heavier.....3.3c
Plow Slabs.....3.5c
“ Wings.....3.8c

Sheet Iron.

	Common.	Charcoal.	Juniata.
No. 10 to 14	3.5c	4.0c	6.5c
No. 15 to 17	3.8c	4.3c	6.8c
No. 18 to 21	4.1c	4.6c	7.1c
No. 22 to 24	4.3c	4.8c	7.3c
No. 25 & 26	4.5c	5.0c	7.5c
No. 27	4.7c	5.2c	7.7c
No. 28	5.1c	5.6c	8.1c

All sheets No. 18 and lighter, over 30 inches wide, not less than 2.10c extra.

Wood's Patent Planished Sheet.

1st quality (A).....10½c | 2d quality (B).....9 c

Galvanized C. H. B.—(Charcoal Hammered Blooms.

Nos. 14 to 20	12c	No. 27	14c
Nos. 21 to 24	13c	No. 28	16c
Nos. 25 and 26	14c	No. 29	18c

42½ @ 45 % discount.

Coal Screen Iron.

1¾ by ⅝ by 5-16.....3.0c | 1 by ⅝ by 5-16.....3.5c

Angle Iron.

2½, 3, 3½ and inch.....3.3c
1½, 1⅝, 2 and 2¼ inch.....3.3c
1¾ inch.....3.4c
1 “ 3.6c
1⅜ by 1 inch, for Plow Handles.....3.8c
1¾ by ⅜ “ “ “ 3.8c
1⅜ by ¼ “ “ “ 3.9c

T Rail.

8 lbs. to the yard.....2.9c | 20 lbs. to the yard.....2.8c
12 “ “ .....2.8c | 28 “ 2.8c
16 “ “ .....2.8c | 30 “ 2.8c

Splice Joints for 12, 16 and 20-lb. Rail, 40c each; 28 and 30 lb. Rail, 50c. each; 40 lb., 60c each.
3½ by ⅜ and ½ Spikes for 20 and 28-lb. Rail.....4½c
2½ and 3 by ⅜ “ “ 12 and 16-lb. “ 4¾c
2½ by 5-16 “ “ 8-lb. Rail.....5¼c

Flat Rails.—Punched and Countersunk.

1¾ to 2 by ⅛ to ⅜ inch.....3.0c
1⅛ by ⅜ and 7-16 inch.....3.2c
1¼ by ⅜, 7-16 and ½ inch.....3.4c

Juniata Nail Rods.....6.4c
Norway “ 8.0c
Guard Iron ¾x⅜x1⅛ and ⅞x⅜x1⅛.....4.0c
“ “ ⅝x⅜x2 9-16 and ⅝x½x1⅛.....4.2c
Drag Bars.....3.8c
Dropper Bars.....3.8c
Cylinder and Lawdside Iron.....3.8c
Plow Beam iron.....3.6c

Nails.
See Pittsburgh Trade Report.

Best Quality Refined Cast Steel.
Square, Flat, Octagon and Round.

⅜ ⅝ 1 inches, inclusive.....11c
1-16 and 2⅛ to 3 inches.....13c
¼ and 3¼ to 4 “ 13c
7-32 and 4⅛ to 5 “ 14c
5-16 and 5⅛ to 6 “ 17c
5-32 inch.....22c
⅛ inch.....90c
Oil Well Steel Forgings.....20c

Machinery Steel.

	Crucible.	Bessemer & Open Hearth
Ordinary Sizes, ¼ to 2 inch		
Round	7c	6c
5-16 and 2¼ to 3 inches	8c	6c
¼ and 3¼ to 6 “	9c	7c
7-32 inch	10c	8c
5-16 “	12c	10c

Square, Flat and Octagon, ½c extra throughout the list.
Cut to specified lengths, ½c extra.

Hammer Cast Steel.

Crucible Cast Steel.....8½c
Open Hearth Cast Steel.....7c

Sheet Steel.—Crucible.

	Best.	2d Qual.	3d Qual.	Bessemer & Open Hearth
To 21 gauge.	12c	11c	9c	7c

1c. extra for each additional gauge.
Cut to multiples or specified lengths, ½c. extra.

Miscellaneous Cast Steel.

Auger and Auger Bit.....8½c
Axle Steel for carriages and wagons.....8½c
Frog Points and Plates.....10c
“ Side Bars.....8½c
Pick, plain (hammered).....10c
“ and Mattock, beveled (rolled).....8½c
Skate Steel.....9c
Table Cutlery, plain.....7c
Table Cutlery, beveled.....7½c
Pike and Cant Hook.....8½c
Coal and Granite Wedge.....8½c
Roller.....8½c
Spindle, subject to Machinery classification.....8½c
Tran Spring Steel.....10c
Forged Crank Pins and Lathe Spindles.....11c
Piston Rods, plain.....8½c
“ forged to shapes.....11c
Slide Bars, plain.....8½c
“ forged to shapes.....11c

Crucible, Open Hearth or Bessemer.

Boiler, Fire-Box and Flue Sheets, not less than 3-16 thick.....6½c
Boiler, Fire-Box and Flue Sheets, not less than ¼ thick.....7½c
Circulars and semi-circulars, when ordered separately.....8c
Smoke Stack, to shape.....8c
Locomotive Tank Steel.....7c

File Cast Steel.

Square, Round, Half Round and Flat Bastard, 8-inch and over.....8c
Mill Saw, 8-inch and over.....8½c
Taper, 3½-inch and over.....9½c
Horse and Shoe Rasp.....8½c

Spring Cast Steel.

Spiral and Taper, cut to lengths.....6½c

Tire Cast Steel.

1x¼ and over.....8½c
1x3-16, ¾x3-16 and ¼.....9c
1 and 1¼-10x¼ and 5-32, ¾x3-16 and 5-32.....9½c
⅝ and ⅝x⅛ and 3-32 and 12 g.....11c
Solid Safe Cast Steel.....7½c
Three and Five Ply Cast Steel.....10c

Agricultural Implement Cast Steel.

Fork and Rake, Crucible.....8c
Horse Rake Steel, cut to lengths, Crucible.....8c
Hoe, Crucible.....7½c
Corn Stalk Cutter, beveled.....9½c
Beveled Hoe and Shovel Steel in Bars.....8½c
Crucible Plow Steel in slabs.....6½c

Bessemer and Open Hearth.

Spring.....4½c
“ spiral and taper, cut to lengths.....5½c
Tire, ⅜-16 thick and above.....4½c
Toe Calk.....4½c
Plow.....4½c
Axle Billets.....4½c
Sleigh Shoe.....4c
Cutter Shoe, cut to lengths and tapered.....5½c
Scythe Back Steel.....4c
Grain Drill Bars.....5½c
“ Points.....8½c
Rolling Coulter Blanks, cut and punched.....9½c
Thrasher Steel.....4½c
“ Teeth.....5½c
Rolled Hammer Billets.....4½c

Terms.—Four months; 1 per cent. discount for cash, if remitted within 30 days.

Rolls and Castings.

Furnace Floor and Straightening Plates.....2 c
Housings and Castings not otherwise specified.....3 c
Guide Plates.....3½c
Spindles and coupling boxes.....3½c
Sand Rolls and Pinions, large size.....3 c
“ “ small size.....3½c
Pipe Mill Castings.....4 c
Rolling Mill Castings under 40 lbs.....4 c
Spur and Bevel Wheels, large.....4 c
“ “ small.....4½c
Pulleys up to 30 inches.....4½c
“ over 30 inches.....4½c
Engine Castings, light.....4 c
“ “ heavy.....4½c

Chilled Rolls.

6 to 8 in. diam., to 20 in. long.....5c
8 to 15 in. “ 8 to 40 in. “ 4½c
24 to 24 in. “ 15 to 72 in. “ 4½c
14 to 31 in. “ 72 to 108 in. “ 4½c

After Oct. 1, 1881, no discounts will be made at settlement as heretofore, prices quoted being net.

White and Red Lead.

Strictly Pure White Lead in Oil, in kegs, 6½c.; in 25 ℔ Tin Pails, ¼c. ₩ ℔ over keg price; 12½ ℔ Tin Pails, 1c ₩ ℔ over keg price; assorted, 1 to 5 ℔ cans, 3c. per ℔ over keg price.
Dry White Lead in barrels.....6¼c
Red Lead, very brilliant, in kegs, 6¼c; in barrels 6¼c
Litharge (Potter's Lead) “ 6½c; 6¼c
Freights equalized with all points where White Lead is made.
Terms: Note at sixty days, or if paid within 15 days from date of invoice a discount of 2½ per cent. will be allowed, but not otherwise.

Window Glass.

Discount, 70 % on Single Strength, 70 & 10 % on Double.

Single Strength.

Size.	AA.	A	B.	C.
5 x 8 to 10 x 15	$8.25	$7.50	$7.00	$6.50
11 x 14 to 16 x 24	9.25	8.50	8.00	7.25
18x 22 to 20 x 30	10.75	9.75	8.75	7.75
15 x 36 to 24 x 30	12.25	10.75	9.00	8.00
26 x 28 to 24 x 36	13.00	11.50	9.75	9.00
26 x 36 to 26 x 44	14.50	13.25	10.75	9.50
16 x 46 to 30 x 50	15.00	14.00	11.25	10.50
30 x 52 to 30 x 54	16.00	14 50	12.00	
30 x 56 to 34 x 56	17.25	15.50	13.50	
34 x 58 to 34 x 60	18.25	17.25	15.00	
36 x 60 to 40 x 60	20.75	18.75	17.25	
Double Strength.				
6 x 8 to 10 x 15	12.75	11.75	10.75	10.00
11 x 14 to 16 x 24	14.50	13.25	12.50	11.25
18 x 22 to 20 x 30	17.25	15.75	14.00	
15 x 36 to 24 x 30	19.75	17.25	14.50	
26 x 28 to 24 x 36	21.00	18.50	15.75	
26 x 36 to 26 x 44	23.25	21.25	17.25	
26 x 46 to 30 x 50	24.00	22.50	18.00	
30 x 52 to 30 x 54	25.75	23.25	19.25	
30 x 56 to 34 x 56	27.75	25.00	21.75	
34 x 58 to 34 x 60	29.25	27.75	24.00	
36 x 60 to 40 x 60	33.25	30.00	27.75	

An additional 10 per cent. will be charged for all glass more than 40 inches wide. All sizes above 52 inches in length and not making more than 81 united inches, will be charged in the 84 united inches bracket.

Hubbard, Bakewell & Co.'s Goods.

Axes, Single Bit, Lippincott.....Per doz. $8.00
“ “ James & Co “ 7.00
“ Double Bit, Lippincott “ 15.00
“ “ James & Co “ 12.00
Drain Tools, list.....dis 20%
Hoes, Planters'.....dis 55%
“ Scovill Pattern.....dis 55%
“ Handled, Square Eye, German.....dis 25%
Handles, Cross Cut.....Per doz. $3.50
“ Shovel, Bent, Bored, Riveted.. “ 2.50
Saws, Circular.....dis 40%
“ Long.....dis 40%
“ Cross Cut, H. B. & Co., Champion. Per ft. nes.....$0.35
“ Cross Cut, Lippincott, Champion. Per ft. net.....30
Shovels, list.....dis 20%
Spades, “ .....dis 20%
Scoops, “ .....dis 20%

HENRY DISSTON & SONS,

KEYSTONE SAW, TOOL, STEEL & FILE WORKS,

Front and Laurel Streets, PHILADELPHIA.

SKEW-BACK SAWS.

D8 HAND SAW.

His Saw has all the latest improvements in Hand Saws, and is warranted superior to all others, and is giving entire satisfaction.

We call the attention of the trade to our new styles of

COMMON HAND SAWS,

the *cheapest* in the market. We are also offering

SUPERIOR CROSS-CUT SAWS

FOR THE FALL TRADE.

☞ *Send for Price List.*

Prouty's Patent PEERLESS FORCE PUMP.

Has Self-Adjustable Foot Rest.

NEW AUTOMATIC COMPENSATING PACKING.

It will throw a continuous jet FROM FORTY TO SIXTY FEET. A new pattern jet and spray nozzle is sent with each pump.

Especial attention is called to the material and workmanship exhibited in these pumps.

LIST PRICE, $8.

THE NEW ENGLAND BUTT CO.

PROVIDENCE, R. I.

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DAYTON, - - - OHIO.

MANUFACTURERS OF

REVOLVING BOLT AND SCREW CASES.

We are the only manufacturers of Bolt cases and the only parties who make lists of Bolt or Screw Cases to suit stock of purchaser without extra charge. All goods guaranteed. Send for Illustrated Circular.

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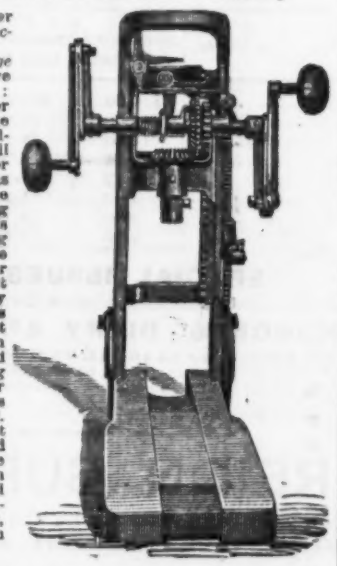
We are also extensive manufacturers of **Fruit Can Sealing Wax.** Send for Circulars and Prices.

Very Respectfully,

THE AMERICAN BOLT & SCREW CAS CO.

SAUNDERS' PATENT AUTOMATIC BORING MACHINES

FOR BUILDERS' AND FRAMERS' USE,



are universally acknowledged to be superior to all other *Boring Machines*, and we *guarantee* to give better *satisfaction* than any other machine.

Ship Builders, House Builders, Dock Builders, Bridge Builders, Carpenters and *Farmers* please notice what we claim for our machine, and we guarantee all that we claim: First, that it will do nearly double the work of any other machine in the same length of time, with greater ease to the operator; that we can regulate the speed of the bit according to the size of the same, or to suit the operator; it will drive the bit any required depth, and the bit or auger returns from the hole by the same automatic motion without the operator stopping the machine; at the same time clearing itself and leaving the hole entirely free from chips; it is gauged to bore such a depth as may suit the operator, boring two or more holes at exactly the same depth after being once set, without any attention from the operator; it is an angular machine and will bore on any angle; it is the most compact machine; it can be placed in so small a compass as to occupy but little room in a carpenter's tool chest, and while in this compact form it can be carried in the hand with the greatest ease and convenience; it is the most durable machine, from the fact that we use the best material in its construction, and each part can be duplicated in case of accident by sending directly to us. We finish the ironwork with a baked or heated Japan finish which enables it to withstand all kinds of weather, the woodwork being rubbed in oil and shellaced. They are the cheapest Boring Machines in the world for what they can do. We are introducing the Gladwin Improved Auger in connection with this machine. This auger is the best Boring Machine Auger made, being a self-clearer in gummy or knotty wood. We offer the Borer, boxed and delivered on board cars, for $6. with full set Gladwin Improved Augers, 18 qrs., $9; or with extra finished beds, $6.50, and full set augers, 18 qrs., $9.50. A discount given for large orders. Send for Descriptive Catalogue.

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LOUDERBACK GILBERT & CO., 33 Chambers St., New York.
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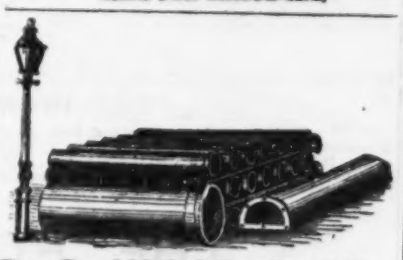

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Philadelphia,

Manufacturers of

Cast Iron Pipe

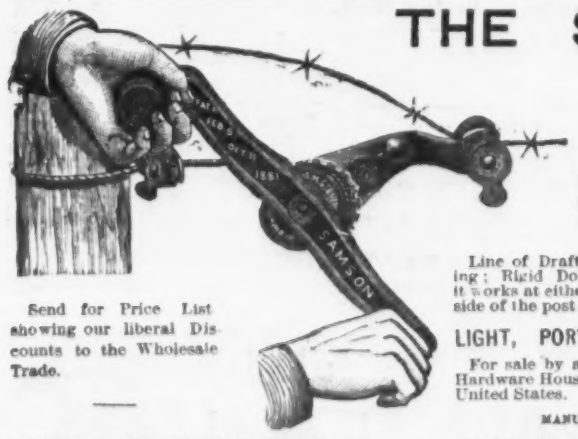
FOR WATER AND GAS,

Lamp Posts, Valves, &c.,

Mathew's Pat. Anti-Freezing Hydrants

400 CHESTNUT STREET.

THE SAMSON WIRE STRETCHER



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Line of Draft direct; always Self-Adjusting; Rigid Double Handle; Double Pawl; it works at either end of the fence, at either side of the post and either side up.

LIGHT, PORTABLE, SIMPLE, SURE.

For sale by all leading wholesale Jobbing Hardware Houses and Barb Wire men in the United States.

MANUFACTURED ONLY BY

Send for Price List showing our liberal Discounts to the Wholesale Trade.

SAMSON NOVELTY WORKS, Nos. 14 & 16 Main St., De Kalb, Ills.

AND IN CANADA BY

BULLOCK HARDWARE CO., Otterville, Ontario.

ONONDAGA PATENTED ROAD SCRAPER.

The BEST and CHEAPEST in the WORLD. We not only guarantee it a good scraper, but can safely say it has no equal. Price, $25. Liberal discount to agents. Send for circulars. Address

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Lemon Squeezer,

With perforated strainer. It will squeeze one-third more juice from a lemon than any other; also quicker and more durable than any other.

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Best, Cheapest and Fastest Selling

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On the Market.

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MACHINERY FOR

Straightening and Cutting Wire

Of all Sizes to any Length.

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MORSE TWIST DRILL AND MACHINE CO.

NEW BEDFORD, MASS., Sole Manufacturers of

Morse Patent Straight-Lip Increase Twist Drill,

Beach's Patent Self-Centering Chuck, Solid and Shell Reamers,

BIT STOCK DRILLS,

DRILLS FOR COES, WORCESTER, HUNTER AND OTHER HAND DRILL PRESSES. BEACH'S PATENT SELF-CENTERING CHUCKS, CENTER AND ADJUSTABLE DRILL CHUCKS, SOLID AND SHELL REAMERS. DRILL GRINDING MACHINES. TAPER REAMERS, MILLING CUTTERS AND SPECIAL TOOLS TO ORDER.

All Tools exact to Whitworth Standard Gauges.

GEO. R. STETSON, Supt. EDWARD S. TABER, Treas.

BEECHER & PECK

Successors to Hilo Peck, Manufacturers of

PECKS **DROP** PRESS

PECK'S DROP LIFTER is the only one which has its parts cushioned. Being thus cushioned they are the most durable Lifter in the market.

Can be attached to any drop now in use.

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MATTHIESSEN & HEGELER ZINC COMPANY,

LA SALLE, ILLINOIS,

MANUFACTURERS OF

Refined Spelter, Sheet Zinc and Sulphuric Acid.

ALL ORDERS FILLED PROMPTLY.

WROUGHT IRON TACKLE BLOCKS,

Swivel Hooks for Rope or Chain,

POLISHED GROOVES, ALL SIZES IN STOCK.

Also Pulley Blocks for Wire Rope,

Headquarters for the

RVING BRAND WOODEN PULLEY BLOCKS,

McCOY & SANDERS, Manuf'turers,

26 Warren Street, New York.

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NORTH CAROLINA HANDLE CO.

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Handles and Spokes,

79 Reade Street and 97 Chambers Street, ... NEW YORK.

HARDWARE COMMISSION MERCHANT.

PHILADELPHIA.

Corrected Weekly by Lloyd, Supplee & Walton.)

Terms, 30 days. For 60 or 90 days, interest added at 10% per cent. per annum.

Anvils.
Peter Wrights, ₩ lb ..... 11 @ 11¼c
Over 200 lbs 11¼c
Trenton 10½
Eagle Anvils, American, 10c ..... dis 20 %

Apple Parers.
Globe Apple Pearers ..... $5.00 net
Penn Apple Parers ..... $6.00 net
Lots of 10 to 25 dozen special prices.
Bay State Peach Parer $9 00

Axes.
Hunt's Kentucky and Yankee, per doz ..... $8.50 @ 9.00
Robert Mann ..... $8.00 @ 8.50
Richland Chief ..... " $7 50 @ 8.00
Beveled Axes ..... " and 50c net
Double Bit Axes ..... net " $14.50 @ 15.50

Augers and Auger Bits.—New List January 7, 1880.
Bates' Nut Augers ..... dis 45&10 %
Cook's Augers ..... dis 40&10 %
Watrous' Ship Augers ..... dis 15 %
Benjamin Pierce Auger Bits ..... dis 40 %
Griswold Auger Bits ..... " dis 45&10 %
Cook's " ..... dis 40&10 %
Jennings' " ..... dis 10, 10&10 %
Bonney's Pat. Hol. Augers, list $48 ₩ doz ..... dis 20&10 %
Stearns' Pat. Hol. Augers, list $48 ₩ doz ..... dis 20&10 %

Balances.
Light and Common ..... dis 15&10 %

Bells.
Bevin Bros. Mfg. Co. Light Hand Bells ..... dis 70 %
Swiss Pattern Hand Bells ..... low list dis 40&10 %
Connell's Door Bells ..... dis 15 & 20 %
Gt. Western & Kentucky Cow new list ..... dis 60 %

Boring Machines
Upright, without Augers ..... List 5.50 } dis 45@50 %
Angular, without Augers ..... " 6.75 }

Bolts.—Eastern Carriage Bolts ..... dis 80 @ 80 & 10 %
Philadelphia " ..... new list dis 70&10 %
Stanley, Wrought Shutter ..... dis 50&10 %

Braces.—Barber's ..... dis 10&5 %
Backus ..... dis 50 %
Spofford ..... dis 50&5 %
American Ball ..... dis 55 %

Butts.—Cast Fast Joint, Narrow ..... dis 45&10 %
" " " Broad ..... dis 45&10 %
Cast Loose Joint, Narrow ..... dis 55&10 %
" " Broad ..... dis 55&10 %
" Acorn, Loose Pin ..... dis 50&10 %
" " Jap'd ..... dis 60&10 %
" Mayer's Loose Joint ..... dis 60&10 %
Wrought Loose Pin ..... dis 55&10 %
" Table Hinges and Back Flaps ..... dis 40&10 %
" Narrow, Fast ..... dis 50&10 %
" Loose Joint ..... dis 55&10 %

Blind Butts.
Parker ..... dis 70 & 2 %
Clark ..... dis 70 & 2 %
Shepard ..... dis 70 %
Lull & Porter ..... dis 70&10 %
Huffer's ..... dis 50 %

Chains.—German Halter and Coil, list December 31, 1881 ..... dis 45&5 50 %
Galvanized Pumps ..... ₩ lb 9½c net
Best Proof Coil Chain—English.

₩ lb.	13	10	8½	7½	7¼	7	gold
	4-16	¼	5-16	⅜	7-16	½	in.

Chisels.—Socket Framing ..... dis 65&10 %
Socket Firmer ..... dis 65&10 %
Butcher's ..... $8.00 to $ gold

Casters.—Bed (new list July 1, 1880,) ..... dis 40@50 %
Plate ..... dis 25@50 %

Coffee Mills.—Box and Side, new list Jan. 1, 1880 ..... dis 45 %
Enterprise ..... dis 25 %

Cutlery.—Waldon Pocket ..... new list net
Penna. Knife Co ..... new list net
Landers, Fra y & Clark, J. Russell & Co., Lamson & Goodnow Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices net.

Drawing Knives.
Hart Mfg. Co.'s ..... dis 65&10 %
Adjustable Handle ..... dis 20 %

Fry Pans.
Tinned ..... dis 45 %

₩ doz.	$3.50	4.00	4.50	5.00	5.50	6.50	7.50	9.00	10.00
No.	0	1	2	3	4	5	6		8

Burnished ..... dis 60, 10 & 5 %

₩ doz.	$3.00	3.75	4.25	4.75	5.25	6.00	7.00	8.00	9.00
Fo.	0	1	2	3	4	5	6	7	8

Flies.
Nicholson ..... dis 50 %
Disston ..... dis 50 %
Butcher ..... dis 50 %

Fluting Machines.
Eagle—3¼ in. roll ..... each, $2.25 } dis 25 %
" —4¼ in. roll ..... " 2.85 }
Crown—4½ in. roll ..... " 3.50 } dis 25 %
" —6 in. roll ..... " 4.00 }
" —8 in. roll ..... " 6.50 }
Geneva Fluter ..... dis 25 %
Favorite com Fluter & Sad Iron ..... ₩ doz $10.50 net

Hammers.
Yerkes & Plumb's, new list ..... dis 30 %
Maydole Hammers ..... dis 15 %
Howell A. E. Nail Hammers, ... per doz. net $3.75

Handles.
Disston Loop Handles Crosscut ..... 33c pair net
Boynton Loop Handles Crosscut ..... 33c pair net

Hatchets.
Yerkes & Plumb, new list ..... dis 30 %
Hunt ..... dis 25 %

Hinges.
Strap and T ..... dis 55 & 10 %

Horse Nails.

Nos.	4	5	6	7	8	9	10	
Globe	24	23	19	18	17	16	dis	12½ %
Vulcan	30	23	21	20	19	18	dis	12½ %
Ausable	30	27	25	24	23	22	dis	30&10 %
" Polished and P't'd								
& Blued & P't'd.	31	28	26	25	24	23	dis	10&10%
Clinton	21	21	20	19	18	dis	40&10%	
" Polished & Pointed.	24	22	21	20	19	dis	50&10%	

Hay and Straw Knives.
Lightning ..... per doz. net $18.00
Electric ..... " " 16.00
Wadsworth ..... " " 10.50
Walton Straw Knives ..... " " 17.00

Locks and Knobs.
Branford ..... new list dis 45, 10& 2 % cash
Garland Cabinet ..... dis 25&2 % cash
American Padlocks ..... dis 30, 10&2 % cash
Scandinavian Padlocks ..... dis 40 %

₩ doz.	$5.00	5.50	6.50	7.50	8.50	10.50	12.50	} dis 60 %
No.	57	58	59	60	61	62	63	
₩ doz.				$18.00	26.00	33.00	} dis 60 %	
No.				64	65	66		

Lanterns.
Buckeye ..... Large list net; small list net
Tubular ..... No. 0, $8.65; No. 1, $10.15 ₩ doz net
Guards, 25 cents extra per doz. net.

Lawn Mowers.—Pennsylvania ..... } new list
Philadelphia ..... } dis 30 %
Excelsior ..... }

Lawn and Garden Pumps.
Holland Patent ..... List $4.00 dis 10 %

Mattocks.
Long and Short Cutter ..... new list ..... 45 %
Pennsylvania Pattern ..... dis 4 %

Molasses Gates.
Enterprise Mfg Co.'s Measuring Faucets ..... dis 25 %
Stebbins' Gates ..... dis 70&10%
Lincoln's " ..... dis 60&10 %
Landers, Frary & Clark's Petroleum ..... dis 20&10 %
Brass Liquor Cocks, new list Jan. 1 1883. ..... dis 45 %
Cork Lined " ..... dis 70 %

Meat Cutters.
Dixon's ..... dis 25&5 %
Woodruff ..... dis 25&5 %
Stowe ..... dis 25&5 %
Hale's ..... new list, dis 50, 10&2½ cash
American ..... dis 25 %
Stuffers ..... dis 25&5 %
Enterprise Stuffers ..... dis 25 %

Planes.—Sandusky Tool Co ..... dis 20 %
Ogonts ..... dis 25 %
Ohio & Auburn ..... dis 20 %
Bailey (S. R. & L. Co.) ..... dis 20&10 %

Plane Irons.—Ohio Tool Co ..... dis. 20 %
Butcher's $4.00

Plumbs and Levels.
Stanley's Adjustable ..... dis 50&10 %
" Non-Adjustable ..... dis 50&10 %

Picks.—New list ..... 40 %

Razor Straps.
Lamont Combination ..... per doz. $4.00
" " ..... 4 gross lots $42.00
Imitation Emerson ..... per doz. 2.00

Rules.—Stanley Boxwood ..... dis 70 &10 %
Stanley Ivory ..... dis 50&10 %

Steelyards.—Hart's Pattern ..... dis 33⅓&10 %

₩ doz.	$14.40	17.75	21 00	26.40	31 00	35.40
Lbs	50	100	150	200	250	300

American Pattern ..... dis 33⅓&10 %

₩ doz.	$8.00	10.25	13.75	15.00	18.75	19.50
Lbs	50	100	150	200	250	300

Squares.
Steel and Iron ..... dis 40 ; full case, dis 40&10&2 for cash
Try Squares, Stanley ..... dis 40&10 %
Disston's Try Squares ..... dis 40 %

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened ..... ₩ doz $9.00
Clipper No. 10, Bronzed Blade, Boxed and Sharpened ..... ₩ doz $3.50 } 30
Clipper No. 5, Painted Red, Boxed and Sharpened ..... ₩ doz $3.00 }

Saws.—Disston's Hand, Panel and Rip ..... dis 20 %
Disston's Circular ..... dis 40 %
Cross-Cut No. 2, Plain Tooth ..... dis 40%
" Patent Tooth ..... dis 40%
" Champion Tooth ..... dis 40%
Boynton's Lightning Cross Cut, new list ..... dis 40 %
" Lightning Buck Saws, cross bar ..... dis 40 %

Shovels and Spades.
Oliver Ames & Sons, new list ..... dis 15 %
Griffiths ..... dis 40&10&2½
Rowland ..... dis 50&10&2½

Sad Irons.—4 to 10 lbs ..... ₩ lb 33½c
Mrs. Potts' Patent ..... dis 30 %

Stone.
Washita Extra ..... ₩ lb 28c net
" No. 1 ..... " 18c
" No. 2 ..... " 10c
" Slips ..... " 87c
" Axe ..... " 150 net
Hindostan Oil Stone No. 1 ..... ₩ lb 60 } dis 33⅓ %
" Axe Stone ..... " 80 }
" Slips ..... " 120 }

Screws.
Flat Head Iron, new list Dec. 27 ..... dis 40 & 20%
Flat Head Brass, new list Dec. 27 ..... dis 30 & 5 %
Round Head Brass, new list Dec. 27 ..... dis. 40 & 10 %
Round Head Iron, new list Dec. 27 ..... dis. 40 & 10 %

Screws.
Plated ..... dis 40; 10 & 5 %
German Silver ..... dis 30 @ 10 %
Britannia, Boardman's ..... dis 50 %
" Parker's ..... dis 50& 10 %
Tinned ..... dis 10 %

Springs.—Forging ..... dis 50 %
Gem No. 3 Small Jap'd ..... $2.00 } dis 40 & 10 %
" No. 2 medium Jap'd ..... 2.75 }
Coil No. 10, per gross net $6.00
Other Standard Springs ..... dis 60& 10 %
Warner Door Springs, per doz. net 1.75
Standard Spring Hinges—
Single No. 0, per doz. net 1.25
" No. 1, " " 1.50
Other Standard Spring Hinges ..... dis 20&10 %

Stocks and Dies. ..... dis 10&2 %

Stove Polish.—Gem ..... ₩ gross, $4.50, dis 5 %
Dixon ..... 6.00, dis 10%
Fire Fly ..... $3.00 gross net

Tacks. ..... dis 30&10 %
Shoe Nails—4-8, and over 8c ..... } 10 %
" " 3½-8, and under 9c ..... }
Double Pointed Tacks ..... dis 40&5 %

Traps.
Genuine Oneida—Newhouse ..... dis 35 %
Im. Oneida—Newhouse list, first qual dis 55&5 @ 60 %

Vises.—Solid Box Trenton new list ..... dis 35 %

Wrenches.—Agricultural ..... dis 70 %
Coes' Genuine ..... dis. 50&5 %
Coes' Mechanics' ..... dis. 50&10&2½
" " Mall. Bar ..... dis 75 %

Wire.
Bright or Ann'd, No. 0 to 18 ..... dis 55½ to 55 %
" No 19 to 26 ..... dis 60 to 60½ %
" No. 27 to 36 ..... dis 65 to 67½ %
Coppered, 0 to 18 ..... dis 47½ to 50 %
Tinned Broom Wire ..... dis 55 to 57½ %
Galvanized Barb Wire 90cts
Painted Barb Wire 80
Galvanized No. 7 to 18 ..... Market List, dis 40½ to 45 %

Wringers.
Peerless No. 2½ $42.00
" No. 2 ..... 45.00
Universal No. 2½ 42.00
" No. 2 ..... 45.00
Novelty No. 2, for common tubs 42 00
" No. 3, " " 48.00
Excelsior E, for stationary tubs 51.00
" F, " " 57 00
In lots of 1 doz. $3.00 doz. dis. from above price.

PITTSBURGH.

Merchant Iron.

TERMS.—Note or acceptance at 60 days, with current rate of exchange on New York, or a discount of 2 per cent. for cash, if remitted within 10 days from date of invoice.

For fluctuations and discounts on card rates see weekly Pittsburgh Trade Report.

The following are card rates.

Flat Bar.

1¼ to 4 by ⅝ to 1 inch 2.50
1¼ to 6 by ⅜ to 1 " 2.50
1⅜ to 6 by 1⅛ to 1¾ " 2.00
1¼ and 1⅜ by ⅜ to ¾ " 2.60
1 and 1⅛ by ⅜ to ¾ " 2.70
⅛, ¾ and ¾ by ⅜ to ¾ inch 3.00

Rounds and Squares.

1 to 1⅜ 2.40
1 to 2⅜ 2.70
2⅛ to 3¼ 3.00
3⅜ to 4 ..... 3.50
4¼ to 5 ..... 4.00
¾ to ⅞ 2.80

Oval Iron.

⅜ to 1⅜ 2.90
⅞ to ¾ 3.10

Half Oval and Half Round.

⅜ to 1¼ inch 3.20
⅝ to ¾ " 3.50

Horse Shoe.

⅝ to 1¼ by 5-16 to ⅞ inch 3.40

Wagon Box Iron.

¼ inch, Nos. 13 and 14 ..... 3.70
⅜ " " 11 and 12 ..... 3.50
⅜ " " 13 and 14 ..... 4.00
⅜ " " 11 and 12 ..... 3.80
⅜ " " 13 and 14 ..... 4.10
⅜ " " 11 and 12 ..... 4.10

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch 2.70
1¼ to 3¼ by ¼ and 5-16 " 2.70
1 to 1⅜ by ¼ and 5-16 " 2.80
⅝ to ⅞ by ¼ and 5-16 " 3.00
⅝ and ⅞ by ¼ and 5-16 " 3.50

Light Bands.

1¼ to 6 by ¼ to 3-16 ..... 3.00
1¼ to 6 by ⅜ Nos. 11 and 12 ..... 3.10
1 to 1⅜ by ¼ to 3-16 ..... 3.10
1 to 1⅜ by Nos. 11 and 12 ..... 3.20
⅝ and 13-16 by ⅛ to 3-16 ..... 3.40
⅝ and 13-16 by Nos. 11 and 12 ..... 3.50
⅝ and 11-16 by Nos. 11 and 12 ..... 3.80
⅝ and 9-16 by ⅛ to 3 16 ..... 4.00
⅝ and 9-16 by Nos. 11 and 12 ..... 4.10
⅝ inch by ⅛ and 3-16 ..... 4.30
⅝ inch by Nos. 11 and 12 ..... 4.40

Hoop Iron.

1¼ to 4, Nos. 13, 14 and 15 ..... 3.50
1¼ to 2, Nos. 16, 17 and 18 ..... 3.40
1¼ to 2, No. 19 ..... 3.50
1¼ to 2, No. 20 ..... 3.60
1¼ to 2, No. 21 ..... 3.70
1¼ to 2, No. 22 ..... 4.80
15-16 1, and 1¼, Nos. 13, 14 and 15 ..... 3.50
15-16, 1, and 1¼, Nos. 16, 17 and 18 ..... 3.60
15-16, 1, and 1¼, Nos. 19 and 20 ..... 3.70
15-16, 1, and 1¼, No. 21 ..... 3.80
15-16, 1, and 1¼, No. 22 ..... 3.90
⅞, Nos. 13, 14 and 15 ..... 3.60
⅞, Nos. 16, 17 and 18 ..... 3.70
⅞, Nos. 19 and 20 ..... 3.80
⅞, No. 21 ..... 3.90
⅞, No. 22 ..... 4.00
13-16, Nos. 13, 14 and 15 ..... 3.90
13-16, Nos. 16, 17 and 18 ..... 4.00
13-16, Nos. 19 and 20 ..... 4.10
13-16, No 21 ..... 4.20
13-16, No. 22 ..... 4.30
¾, Nos. 13, 14 and 15 ..... 4.00
¾, Nos. 16, 17 and 18 ..... 4.10
¾, Nos. 19 and 20 ..... 4.20
¾, No. 21 ..... 4.30
¾, No. 22 ..... 4.40
11-16, Nos. 13, 14 and 15 ..... 4.40
11-16, Nos. 16, 17 and 18 ..... 4.50
11-16, Nos. 19 and 20 ..... 4.60
11-16, No. 21 ..... 4.70
11-16, No. 22 ..... 4.80
⅝, Nos. 13, 14 and 15 ..... 4.70
⅝, Nos. 16, 17 and 18 ..... 4.80
⅝, Nos. 19 and 20 ..... 4.90
⅝, No. 21 ..... 5.00
⅝, No. 22 ..... 5.10
9-16, Nos. 13, 14 and 15 ..... 4.80
9-16, Nos. 16, 17 and 18 ..... 4.90
9-16, Nos. 19 and 20 ..... 5.00
9-16, No. 21 ..... 5.10
9-16, No. 22 ..... 5.20
9-16, No. 23 ..... 5.30
⅝ inch, Nos. 13, 14 and 15 ..... 5.00
⅝ " Nos. 16, 17 and 18 ..... 5.10
⅝ " Nos. 19 and 20 ..... 5.20
⅝ " No. 21 ..... 5.30
⅝ " No. 22 ..... 5.40
⅝ " No. 23 ..... 5.50

The prices under Hoop Iron do not apply to Cotton Ties.

1-10c per lb. extra will be charged for each gauge lighter than the lightest indicated.

1-10c per lb. extra will be charged for cutting Hoops to specified lengths.

Barrel Hoops.

1¼ to 2 in., cut to length.
9 to 11 lbs. per set of 6 hoops 3.50
8 lbs. and less than 9 lbs. per set of 6 hoops 3.60
Less than 8 lbs. per set of 6 hoops 3.80
Extras for Cutting to Length all Preceding Iron.
All Iron, including Tire 1.10c

Tank Iron.

No. 9 and heavier 3.30
Plow Slabs 3.50
" Wings 3.80

Sheet Iron.

	Common.	Charcoal.	Juniata.
No. 10 to 14	3.40	4.00	5.50
No. 15 to 17	3.80	4.20	6.80
No. 18 to 21	4.10	5.50	7.10
No. 22 to 24	4.30	5.80	7.30
No. 25 & 26	4.40	6.00	7.50
No. 27	4.70	6.20	7.70
No. 28	5.10	6.60	8.10

All sheets No. 18 and lighter, over 30 inches wide, not less than 2.10c extra.

Wood's Patent Planished Sheet.

1st quality (A) ..... 10½c | 2d quality (B) ..... 9 c

Galvanized C. H. B.—(Charcoal Hammered Blooms.

Nos. 14 to 20 ..... 12c | No. 27 ..... 14c
Nos. 21 to 24 ..... 13c | No. 28 ..... 15c
Nos. 25 and 26 ..... 14c | No. 29 ..... 18c
42½ @ 45 % discount.

Coal Screen Iron.

1¾ by ⅝ by 5-16 ..... 3.00 | 1 by ⅝ by 5-16 ..... 3.50

Angle Iron.

2¼, 2, 3¼ and inch 3.30
1½, 1¾, 2 and 2¼ inch 3.30
1¼ inch 3.40
1 ..... 3.50
1¼ by 1 in. 3, for Plow Handles 3.30
1¼ by ¾ " " 3.80
1⅜ by ¾ " " 3.90

T Rail.

8 lbs. to the yard ..... 2.90 | 20 lbs. to the yard 2.80
12 " " ..... 2.60 | 28 " " 2.80
16 " " ..... 2.80 | 30 " " 2.80

Splice Joints for 12, 16 and 20-lb. Rail, 40c each; 28 and 30 lb. rail, 50c. each; 40 lb., 60c each.
3¼ by ⅝ and ⅝ Spikes for 20 and 28-lb. Rail 4½c
2¼ and 3 by ⅝ " " 12 and 16-lb. " 4½c
2½ by 5-16 " " 8-lb. Rail 3½c

Flat Rails.—Punched and Countersunk.

1¾ to 2 by ⅜ to ⅝ inch 3.00
1½ by ⅜ and 7-16 inch 3.30
1¾ by ⅝, 7-16 and ½ inch 3.40

Junista Nail Rods 6.40
Norway " 8.00
Guard Iron, ¼x⅝x⅝ and ¼x¾x¾ 4.00
" ⅜x1⅛x2-16 and ⅜x1⅜x⅜ 4.00
Drag Bars 4.00
Dropper Bars 4.80
Cylinder and Landside Iron 3.00
Plow Beam Iron 4.00

Nails.
See Pittsburgh Trade Report.

Best Quality Refined Cast Steel.
Square, Flat, Octagon and Round.

⅜ to 2 inches, inclusive 11c
1-16 and 2¼ to 3 inches 12c
¼ and 3¼ to 4 " 13c
7-32 and 4¼ to 5 " 14c
5-16 and 5¼ to 6 " 17c
5-32 inch 22c
⅛ inch 30c
Oil Well Steel Forgings 20c

Machinery Steel.

	Crucible.	Bessemer & Open Hearth
Ordinary Sizes, ⅜ to 2 inch		
Round	7c	5c
5-16 and 2¼ to 3 inches	8c	6c
¼ and 3¼ to 6 "	9c	7c
7-32 inch	10c	8c
3-16 "	12c	10c

Square, Flat and Octagon, ½c extra throughout the list.
Cut to specified lengths, ½c extra.

Hammer Cast Steel.

Crucible Cast Steel 8½c
Open Hearth Cast Steel 7c

Sheet Steel.—Crucible.

	Best.	2d Qual.	3d Qual.	Bessemer & Open Hearth
To 21 gauge	12c	11c	9c	7c

1c. extra for each additional gauge.
Cut to multiples or specified lengths, ½c. extra.

Miscellaneous Cast Steel.

Auger and Auger Bit 8½c
Axle Steel for carriages and wagons 8½c
Frog Points and Plates 10c
" Side Bars 8½c
Pick, plain (hammered) 10c
" and Mattock, beveled (rolled) 8½c
Skate Steel 9c
Table Cutlery, plain 7c
Table Cutlery, beveled 7½c
Pike and Cant Hook 8½c
Coal and Granite Wedge 8½c
Roller 8½c
Spindle, subject to Machinery classification 8½c
Trap Spring Steel 10c
Forged Crank Pins and Lathe Spindles 11c
Piston Rods, plain 8½c
" forged to shapes 11c
Slide Bars, plain 8½c
" forged to shapes 11c

Crucible, Open Hearth or Bessemer.

Boiler, Fire-Box and Flue Sheets, not less than 3-16 thick 6½c
Boiler, Fire-Box and Flue Sheets, not less than ¼ 7½c
Circulars and semi-circulars, when ordered separately 8c
Smoke Stack to shape 8c
Locomotive Tank Steel 7

File Cast Steel.

Square, Round, Half Round and Flat Bastard, 8-inch and over 8c
Mill Saw, 8-inch and over 8½c
Taper, 3/16-inch and over 9½c
Horse and Shoe Rasp 8½c

Spring Cast Steel.

Spiral and Taper, cut to lengths 6½c

Tire Cast Steel.

1x¾ and over 8½c
1x3-16, ⅝x3-16 and ¾ 9c
1 and 1⅛-10x¼ and 5-32, ⅝x3-16 and 5-32 ..... 9½c
¾ and ⅝x⅜ and 3-32 and 12 g 11c
Solid Slab Cast Steel 7½c
Three and Five Ply Cast Steel 10c

Agricultural Implement Cast Steel.

Fork and Rake, Crucible 8c
Horse Rake Steel, cut to lengths, Crucible 8c
Hoe, Crucible 7½c
Corn Stalk Cutter, beveled 9½c
Beveled Hoe and Shovel Steel in Bars 9½c
Crucible Plow Steel in slabs 8½c

Bessemer and Open Hearth.

Spring 4½c
" spiral and taper, cut to lengths 5½c
Tire, 1-16 thick and above 4½c
Toe Calk 4½c
Plow 4½c
Axle Billets 4½c
Sleigh Shoe 4c
Cutter Shoe, cut to lengths and tapered 5½c
Scythe Back Steel 4c
Grain Drill Bars 4c
" Points 8½c
Rolling Coulter Blanks, cut and punched 9½c
Thrasher Steel 4½c
" Teeth 5½c
Rolled Hammer Billets 4½c

Terms.—Four months: 2 per cent. discount for cash, if remitted within 30 days.

Rolls and Castings.

Furnace Floor and Straightening Plates ..... 3 c
Housings and Castings not otherwise specified ..... 3 c
Guide Plates 4½c
Spindles and Coupling Boxes ..... 3 c
Sand Rolls and Pinions, large size ..... 3 c
" small size 3½c
Pipe Mill Castings ..... 4 c
Rolling Mill Castings under 50 lbs ..... 4 c
Spur and Bevel Wheels, large ..... 3 c
" " small ..... 4 c
Pulleys up to 30 inches 4½c
" over 30 inches ..... 5 c
Engine Castings, light 4½c
" heavy ..... 4 c

Chilled Rolls.

6 to 8 in. diam., 10 to 20 in. long 5c
8 to 15 lb. " 8 to 20 in. " 4½c
25 to 24 lb. " 15 to 72 in. " 4½c
24 to 25 lb. " 72 to 108 in. " 4½c

After Oct. 1, 1881, no discounts will be made at settlement as heretofore, prices quoted being net.

White and Red Lead.

Strictly Pure White Lead in Oil, in kegs, 6½c.; in 25 ₩ Tin Pails, 7c. ₩ ₩ over keg price: 12½ ₩ Tin Pails, 10c ₩ ₩ over keg price; assorted, 1 to 5 ₩ cans, 9c. per ₩ over keg price.
Dry White Lead in barrels 6½c
Red Lead, very brilliant, in kegs, 6½c; in barrels 6½c
Litharge (Potter's Lead) " 6½c
Freights equalized with all points where White Lead is made.
Terms: Note at sixty days, or if paid within 15 days from date of invoice a discount of 2½ per cent. will be allowed, but not otherwise.

Window Glass.

Discount, 70 % on Single Strength, 70 & 10 % on Double.

Single Strength.

Size.	AA.	A	B.	C.
5 x 8 to 10 x 15	$8.25	$7.50	$7.00	$6.50
11 x 14 to 16 x 24	9.25	8.50	8.00	7.25
18x 22 to 20 x 30	10.75	9.75	8.75	7.75
15 x 36 to 24 x 30	12.25	10.75	9.00	8.50
26 x 28 to 24 x 36	13.00	11.50	9.75	9.00
25 x 36 to 26 x 44	14.50	13.25	10.75	9.50
26 x 46 to 30 x 50	15.00	14.00	11.25	10.00
30 x 52 to 30 x 54	18.00	14 50	13.00	
30 x 56 to 34 x 56	17.25	15.50	13.50	
34 x 58 to 34 x 60	18.25	17.25	15.00	
36 x 60 to 40 x 60	20.75	18.75	17.25	

Double Strength.

6 x 8 to 10 x 15	12.75	11.75	10.75	10.00
11 x 14 to 16 x 24	14.40	13.25	12.50	11.25
18 x 22 to 20 x 30	17.25	15.75	14.00	
14 x 36 to 24 x 30	19.75	17.25	14.50	
26 x 28 to 24 x 36	21.00	18.50	15.75	
26 x 36 to 26 x 44	23.25	21.25	17.25	
26 x 46 to 30 x 50	24.00	22.50	18.00	
30 x 52 to 30 x 54	25.75	23.25	19.25	
30 x 56 to 34 x 56	27.75	25.00	21.75	
34 x 58 to 34 x 60	29.25	27.75	24.00	
36 x 60 to 40 x 60	33.25	30.00	27.75	

An additional 10 per cent. will be charged for all glass more than 40 inches wide. All sizes above 42 inches in length and not making more than 84 united inches, will be charged in the 84 united inches bracket.

Hubbard, Bakewell & Co.'s Goods.

Axes, Single Bit, Lippincott	Per doz.	$8.00
" " James & Co	"	7.00
" Double Bit, Lippincott	"	15.00
" " James & Co	"	12.00
Drain Tools, list		dis 20%
Hoes, Planters'		dis 55%
" Scovill Pattern		dis 55%
" Handled, Square Eye, German		dis 25%
Handles, Cross Cut	Per doz.	$3.50
" Shovel, Bent, Bored, Riveted	"	2.40
Saws, Circular		dis 45%
" Long		dis 40%
" Cross Cut, H. B. & Co., Champion, Per ft. net		$0.35
" Cross Cut, Lippincott, Champion, Per ft. net		.30
Shovels, list		dis 20%
Spades, "		dis 20%
Scoops, "		dis 20%

BOSTON.

Reported by Macomber, Bigelow & Dowse.

Anvil & Vise.—
No. 1, $6.25; 2, 4.25; 3, 3.50 each.....dis 25 %

Augurs & Bitts.—Snell's Auger.....dis 40&10 %
L'Hommedieu's Ship Auger.....dis 15 %
Jenning's Bitts.....dis 10&10&10 %
Cook's Bitts.....dis 40&10 %
Shepardson's Double-Cut Bitts.....dis 45 %
Shepardson's Double Gimlets.....dis 40 %
Stearn's Extension Hollow Augers—
No. 2, ₩ doz., $4.00; No. 3, ₩ doz., $60.00 list..dis 20 %
Bonney's Extension Hollow Augers.....₩ doz $36.00
Pierce's Bitts.....dis 50 %
Griswold Bitts.....dis 60 %

Axes.—Blue Jackets.....₩ doz $9.00
Red Cross.....₩ doz 8.00
Red Cross Handled.....₩ doz 12.00
Dowse Handled Boys'.....dis 33⅓ %

Ax Handles.—
Oak Extra, 31 in., No. A.....₩ doz $2.50
Oak Extra, 34 in., No. A.....₩ doz 2.60
Oak Extra, 31 in., No. B.....₩ doz 2.00
Oak Extra, 34 in., No. B.....₩ doz 2.00
Oak Extra, 31 or 34 in., No. C.....₩ doz 1.40

Axle Clips......dis 50 %
Balances.—Chatillon's.....dis 33⅓ %

Barn Door Rail.—
Cast Angle (for Anti-Friction Hangers).....₩ ft. 20c
Cast Half Round.....₩ ft., ⅝, 30; ⅞, 40
Wrought Round.....₩ ft., ⅝, 30; ⅞, 40; 1, 50

Bells.—Connel's Crank Gong, reduced list..dis 15&10 %

Bird Cages.—
Japanned M. B. & D., reduced list, 1879.....dis 40 %
Brass M. B. & D., reduced list 1879.....dis 33⅓ %

Blind Fasts.—Lock Fasts.....₩ C sets $5.00
No. 6 Fasts.....₩ C sets 6.00
Veadie Fasts.....₩ C sets 6.00
Shedd's.....₩ C sets 7.00

Blind Hinges.—Mall, Hook, 3 holes.....₩ C sets 7.00

Brad Awl Handles.—
Phœnix Adjustable.....₩ doz $2.00

Bolts.—Norway Iron Carriage.....dis 75 %
Common Iron Carriage.....dis 80 & 10 %

Borax.—Refined.....₩ lb 19c

Boring Machines.—
Eagle Upright each.....$5.50 list } dis 40&10 %
Eagle Angle each.....6.75 list }
Snell Augers.....₩ set $2.45

Braces.—Barber's.....dis 40&5 %
Spofford's.....dis 10&5 %
Backus'.....dis 50&5 %

Bracket Saws.—Holly Scroll Saw.....each $2.25
Demas Lathe and Scroll Saw.....each 6.50
Bracket Saws, extra quality, to No. 5.....₩ gro 0.75
Steel Frame, with patterns.....₩ doz 6.40
Lester.....dis 20 %
New Rogers, all Iron.....dis 25 %

Bracket Saw Blades.—Griffith's pat.....₩ gross 75c

Brackets.—
H. B. & M. Flower Pot, reduced list.....dis 33⅓&10 %
Bronzed Shelf, M. B. & D., new list.....dis 40 %
Store Shelf.....dis 40 %

Butts.—Union Fast Joint.....45&10 %
Union Loose Joint.....dis 55&10 %
Union Japanned Acorn.....dis 55&10 %
Union Silvered Acorn.....dis 55&10 %
Union Boston Finish.....dis 70&10 %
Union Spiral Spring.....dis 25&10 %
Wrought Brass.....dis 65&10%

Carriage Bolts.—Eagle Norway.....dis 70&10 %
Common.....dis 80 & 5 %

Carriage Jacks.—Climax No. 1.....₩ doz $2.00
Climax No. 1½.....₩ doz 15.00
Climax No 2.....₩ doz 13.5
Universal.....dis 25 %
Universal No. 1.....each, $2.00
Universal No. 2.....each 3.00
Universal No. 3.....each 6.00
Universal No. 4.....each 6.00
Universal No. 6.....each 6.40

Cartridges.—U. S. Cartridge Co.....dis 75 %

Cards.—
Watson's make Horse & Curry.....dis 10 % } New List,
Watson's Cotton.....dis 10 % } July, 1881.
Watson's Wool.....dis 10 % }

Casters.—Bed and Table.....dis 50 %

Chain.—Traces 6½, 10, 4, straight.....₩ pair 10c
Traces 6½, 10, 4, twisted.....₩ pair 15c
Traces 7, 12, 2, twisted.....₩ pair 80c
Coil 5-16.....₩ lb 11½c
Coil ¼.....₩ lb 8½c
Coil 5-16.....₩ lb 7c
Coil ⅜.....₩ lb 6½c
Coil 7-16.....₩ lb 6c
Coil ½.....₩ lb 5¾c

Chalk.—White, Carpenter's.....₩ gross 50c
Red, Carpenter's.....₩ gross 80c
Blue, Carpenter's.....₩ gross $1.00

Chisels.—Hart, Bliven & Mead, Framing..dis 60&10&10 %
Underhill, Framing.....dis 25 %
Buck's Chisels.....dis 30 %

Clothes Line.—
Galvanized Wire, 100 feet each.....₩ doz $4.00

Coal Hods.—"Dover."—Galvanized, New List.dis 50%
Japanned, new list.....dis 50 %

Coffee Mills.—New List.....dis 25 %

Copper Rivets......dis 40 %

Cow Ties......dis 33⅓ %
No. 30, 3 ft. No. 6 Wire, with toggle.....₩ doz $2.80
No. 35, 3 ft. No. 6 Wire, with snap.....₩ doz 4.00
No. 40, 3½ feet No. 6 Wire, with toggle.....₩ doz 4.30
No. 45, 3½ ft. No. 5 Wire, with snap.....₩ doz 4.40
No. 50, 4 ft. No. 4 Wire, with toggle.....₩ doz 4.75
No. 55, 4 ft. No. 4 Wire, with snap.....₩ doz 5.00
No. 60, 4½ ft. No. 3 Wire, with toggle.....₩ doz 5.50
No. 65, 4½ ft. No. 3 Wire, with snap.....₩ doz 5.80

Cocks.—Brass, L. P. & Co.....dis 40&10 %

Cordage.—Manila, usual trade dis 25.....₩ lb 15½c

Jute......₩ lb 9c

Crow-Bars.—Cast Steel.....₩ lb 7½c
Iron, Steel-pointed.....₩ lb 4c

Cutlery.—Pocket American Shear Co.'s.....dis 40 %
Butcher Knives Wood's, Lap Bolster, Square Handle.....dis 30 %
Steak Knives.....dis 25 %
Lap Bolster, Oval Handle.....dis 20 %
Sticking.....dis 20 %
Skinning.....dis 30 %
Butcher, Common Round Handle, Wood's.....dis 20 %
Shoe Knives, Wood's.....dis 20 %

Dividers.—Cook's.....dis 25 %

Dog Collars......dis 20 %

Door Springs.—Torrey's Rod.....₩ doz $1.60
Imitation Torrey's Rod.....₩ doz 1.45
Gem Coil, new list.....dis 50 & 10 %
Crown.....₩ doz 1.25
Warner's.....₩ doz 2.00

Door Stops.—Thurston's.....dis 50 %

Drawer Knobs.—Thurston's.....dis 50 %

Drills.—Morse Bitt Stock.....dis 25 %
Morse Straight Shank.....dis 20 %

Emery.—Wellington Mills.....₩ lb 10c
Walpole Emery Mills.....₩ lb 9c
Turkish in 10 lb cans.....₩ lb 8c

Enameled Ware.—
Standard Mfg. Co. Kettles.....dis 40 & 10 %
Standard Sauce Pans.....dis 30 %

Fellue Plates.—Wrought.....₩ lb

Files.—American File Co.....dis 50 %
Nicholson File Co.....dis 50 %

Fluting Machines.—Knox list, $4.00.....dis 20 %
American list, $3.40.....dis 20 %

Forks.—W. C. & Co. Manure.....dis 50 %

Gimlet Bits.—
Genuine German, No. 12S, 1-32 to 8-32, per doz $1.00
Pierce's.....per doz .88

Glass Cutters.—Combination Glass Cutter and Knife Sharpener.....₩ doz $1.00

Grub Hoes.—K. P. & Co.'s No 2, $11.50 ₩ doz.dis 40 %

Hammers.—Maydole's.....dis 15 %
Eartford Hammer Co.....dis 20 %

Hangers & Rollers.—Anti-Friction.....dis 40 %
Acme Rollers.....dis 50 %
Climax.....dis 50 %
Common Hangers.....dis 50 %
Common Rollers.....dis 50 %

Hand Screws......dis 10 %

Hatchets.—C. F. Dowse new list.....dis 33⅓ %
Underhill.....dis 30 %

Hay Knives.—Lightning.....₩ doz. $18.00, net
Fisher's Patent.....₩ doz $14.00

Hinges.—Strap and T (new list).....dis 60 %
Providence Plate.....₩ lb 5 %
Wrought Screw Hook.....₩ lb 5 %

Hoes.—W. C. & Co.'s.....dis 60

Hooks and Staples.—Brewers' (new list).....dis 60

Horse Nails.

	No. 6	7	8	9	
Na tional Finished	.23	.21	.20	.19	dis 2 %
Putnam Pointed	.24	.22	.21	.20	5 %
Bridgewater	.21	.19	.18	.17	list

Ice Cream Freezers.—Packer's, new list.....dis 50 %

Knobs.—"Norwalk." New list.....dis 45 %
Silver Glass.....dis 50&10 %
Silver Glass Bell Pulls.....dis 50&10 %

Lanterns.—Tubulars, No. 0.....₩ doz 8.00
Railroad, Oil, No. 43.....₩ doz 9.00
Triangular.....₩ doz 4.00

Lawn Mowers.—The "Daisy."
12 in. cut.....each, $8.00
14 in. cut.....each 8.50
16 in. cut.....each. 9.00
18 in. cut.....each. 9.50

Lead.—Sheet.....₩ lb 7½c
Pipe.....₩ lb 6½c

Locks.—Norwalk.....dis 15 %
Eagle Cabinet.....dis 25 %
Eagle Trunk.....dis 15 %
W. Wilcox & Co., Padlocks.....dis 30 %

Manure Forks.—W. C. & Co.....dis 60 %

Mattocks.—
K. P. & Co., Long Cutter, $16.00 ₩ doz.....dis 50 %
K. P. & Co., Short Cutter, $15.50 ₩ doz.....dis 50 %
K. P. & Co., Pick Cutter, $16.00 ₩ doz.....dis 50 %

Measuring Tapes.—Eddy's.....dis 20 %

Meat Cutters.—Miles' Challenge.....dis 30 %
Hale's, (new list).....dis 40 & 10 %
American.....dis 25 %

Money Drawers.—Tucker's Am.....₩ doz $22.50

Mouse Traps.—Delusion.....₩ doz 1.40
Novelty.....₩ doz

Nails......₩ keg 3.40

Oilers.—Zinc and Tin.....dis 60 %
Brass and Copper.....dis 50 %

Ox Bows.—Extra finished and varnished.....dis 10 %
1¼ in., ₩ doz. pair...$7.00 | 2 in., ₩ doz. pair. $10.00
1⅜ in., ₩ doz. pair... 9.00 | 2½ in., ₩ doz. pair . 12 00

Paper.—Tarred Sheathing.....₩ lb 2½c
Tarred Eagle Brand.....₩ lb 2½c

Picks.—K. P. & Co., Adze Eye, 5 to 6 lb $12.00...dis 50 %
K. P. & Co., Adze Eye, 6 to 7 lb $13.00.....dis 50 %

Planes.—
Fancy Planes.....dis 15 %
Razee Planes.....dis 20 %
N. Y. Tool Co.....dis 25 %
English Iron.....dis 20 %
Bailey's.....dis 20&10 %

Plated Ware.—Rogers & Bro.....dis 40&5 %

Pliers.—Vom Cleff & Co.'s.....net list
Button's Wire Pliers.....dis 33⅓ %

Plumb & Levels.—Stanley R. & L. Co ...dis 60&10 %

Pocket Knives.—American Shear Co.'s.....dis 40 %

Potato Diggers.—W. C. & Co., reduced list..dis 60 %

Pulleys.—Acme or Excelsior, 1¼ in.....₩ doz 24c
Acme or Excelsior, 2 in.....₩ doz 27c

Pulley Blocks......dis 35 %

Pumps.—Union Manufacturing Co.
Iron Cistern.....dis 40 %
Iron Pitcher Spout.....dis 15 %
Copper.....dis 30 %

Rivets.—Black (new list).....dis 40 %
Carriage in 10 lb papers (new list).....dis 40 %
Copper.....dis 33⅓ %

Razors.—Torrey's.....dis 20 %

Razor Straps.—Torrey's.....Full line

Rules.—Stanley, Boxwood.....dis 70 &10 %
Stanley, Ivory.....dis 55&10 %

Sad Irons.—Common.....₩ lb 3½c
Laundry.....₩ lb 6½c
Tailors' Geese.....₩ lb 6c
Enterprise, "Potts".....dis 30 %

Sash Locks.—King & Hutchinson's, new list.dis 40 %
Sandpaper.—Baeder & Adamson.....dis 30 %
M. B. & D.....dis 25 %
Sash Weights.—Patent Eye.....₩ lb 1½c
Saws.—Hand Saws, Disston's.....dis 20 %
Wheeler & Clemson.....dis 20 %
Cross-Cut Saws.
W. M. & Co., Common Tooth, No 1.....₩ foot 35c
W. M. & Co., Champion Tooth.....₩ foot 35c
Disston's, Common Tooth.....₩ foot 30c dis 40 %
Disston's Great American Tooth...₩ foot 60c dis 40 %
Boynton's Light Ing Tooth.....₩ foot 45c
M. B. & D., Hand Saws.....dis 33⅓ %
W. M. & Co.'s Circular Saws.....dis 33⅓ %
Richardson Bros.....dis 25 %

Saw Blades.—Disston.....dis 20 %
W. M. & C.....dis 10 %
Welch & Grimth, Extra.....₩ doz $6.40
Welch & Grimth, No 2.....₩ doz 7.00

Scales.—Fairbanks.....dis 20 %

Screws.—Aiken's Flat-Head Iron new list, dis 50 & 10 %
American Flat-Head Iron.....new list, dis 40 & 10 %
American Flat-Head Brass.....new list, dis 40 & 10 %
American Round-Head Brass...new list, dis 40 & 10 %
American Round-Head Iron...new list, dis 45 & 10 %
Grilley Round Head Nickel-Plated Common..dis 40 %

Scythes.—Clippers, in boxes.....₩ doz $6.75
Shaves.—Kimball's.....₩ inch 75c
Watrous.....dis 15 %
Shears.—American Shear Co., new list.....dis 20 %
Shot.—Tatham's.....₩ lb 7c
Shovels.—O. Ames, new list.....dis 15 %
O. Ames, other brands, new list.....dis 15 %
M. B. & D.....dis 15 %
Sinks.—Magee Patent.....dis 30 %
Snow Shovels......$4.00
Skates.—Union.....dis 25 %
Acme.....dis 25 %
Imperial Club list No. 5, $3.75 ₩ pair list No. 7, $5.00 ₩ pair.....dis 25%
Stocks and Dies.—King's.....dis 10&5 %
Tacks.
Swedes Tinned.....dis 30&10 %
Swedes Iron.....dis 30 & 10 %
Gimp and Lace.....dis 20 & 10 %
Copper Tacks.....dis 30 & 10 %
All balances on list.....dis 5&10 %
Traps.—Oneida, Genuine.....dis 33⅓ %
Oneida, Imitation, H. & N.....dis 50 %
Blake's.....dis 40&10 %
Vises.—Simpson's Adjustable.....dis 25&5 %
Howard Vise Co.....dis 25 %
Prentiss'.....dis 20 %
Weather Strips.—Packer's.....₩ doz $4.00
Browne's Flexible Rubber.....dis 30 %
In 25 feet boxes: No. 1, ⅛ in. wide, ₩ yard, 10c.; No. 2, ⅜ in., 15c.; No. 3, ⅝ in., 20c.; No. 4, 1 in.....25c
Black Walnut Spring Weather Strips...₩ doz $3.40
Window Springs......d'scr½ %
Babcock's No. 3.....₩ gross $6.25
Babcock's No. 4.....₩ gross 4.25
Wire Cloth.—"Clinton".....₩ ft.
Wire Fence.—Scutt's Patent, Painted.....₩ lb 7½c
Scutt's Patent, Galvanized.....₩ lb 6½c
Wire Goods.—Gate Hooks and Eyes, &c., dis 50&10 %
Wrenches.—A. G. Coe's.....dis 50 %
Girard Mfg. Co.....dis 50 & 10 %
Girard Agt.....dis 60 & 10 %
Wringers.—
Novelty No 2 for Common Tubs.....₩ doz 42.00
Novelty " 3 " " " .....₩ doz 44.00
Excelsior E " Stationary Tubs.....₩ doz 55.00
Excelsior F " " " .....₩ doz 63.00
Excelsior A with Folding Bench.....₩ doz 59.00
Excelsior B " " " .....₩ doz 65.00

$3.00 per doz dis if ordered in not less than 1 doz lots, and $6 per doz dis if ordered in not less than 5 doz lots.

Novelty Set Tub, E.....₩ doz 50.00
Keystone, Wood Frame No 1½.....₩ doz 39.00
Keystone, Iron Frame No 2½.....₩ doz 55.00
Zinc.....₩ lb 6½c

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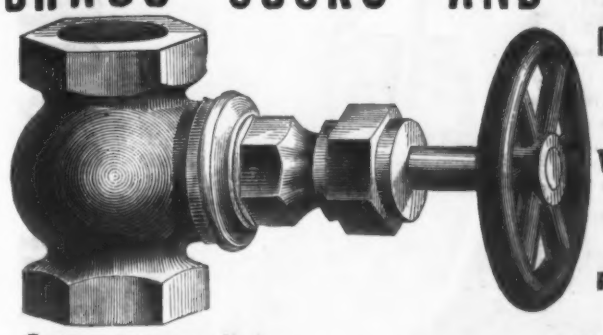

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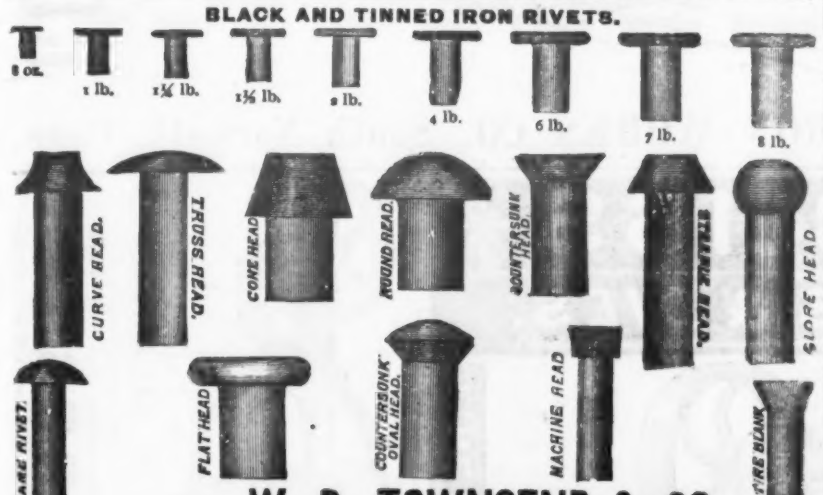

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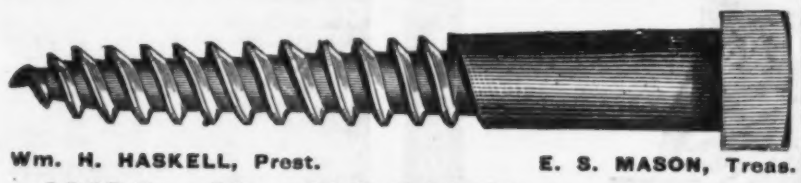

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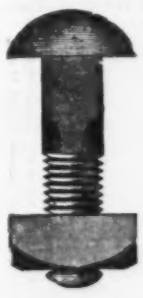

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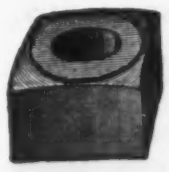

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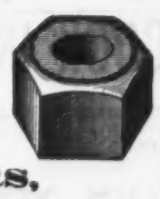

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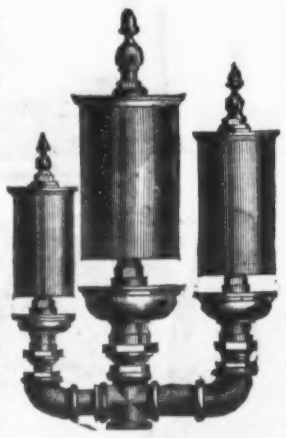

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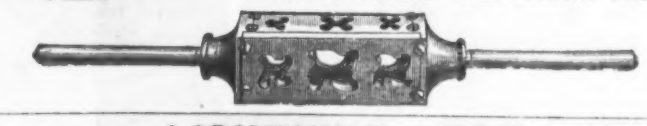

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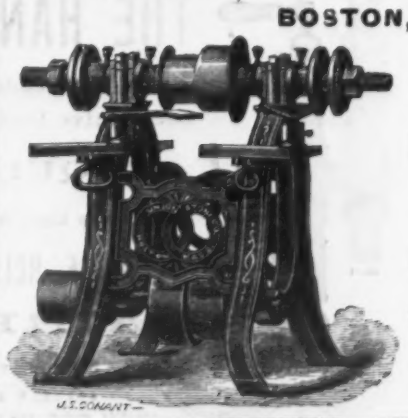

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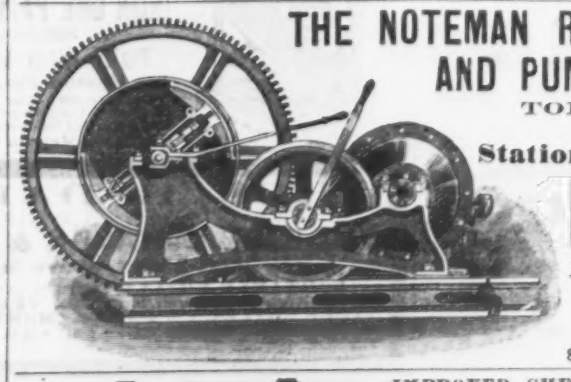

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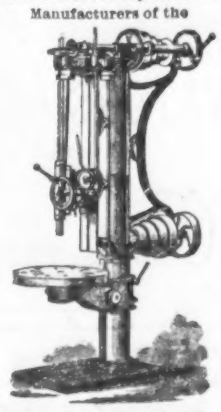

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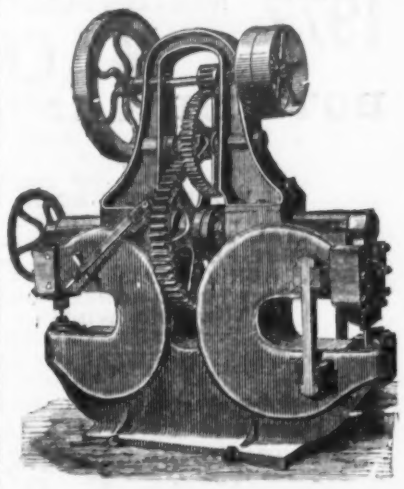

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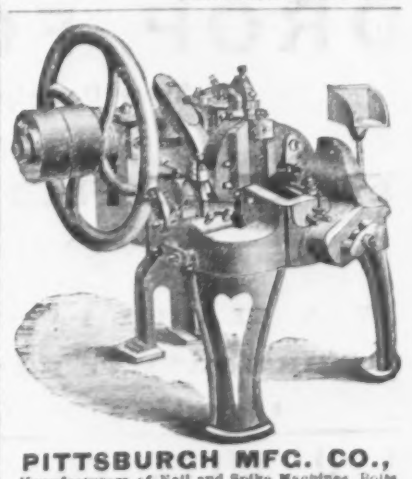

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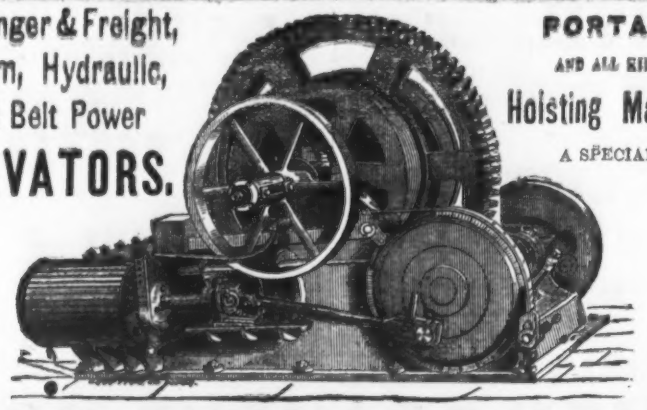

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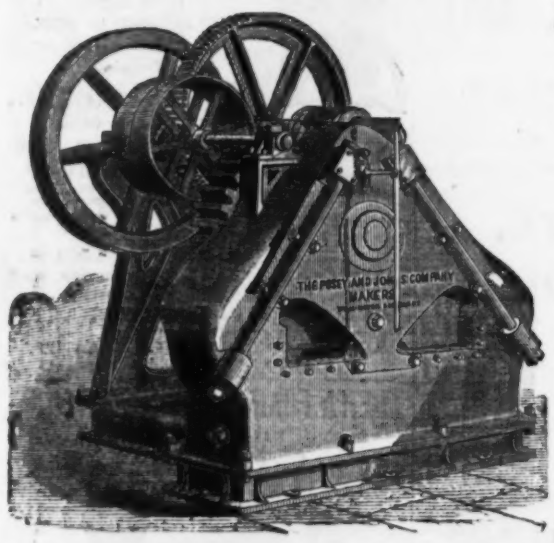

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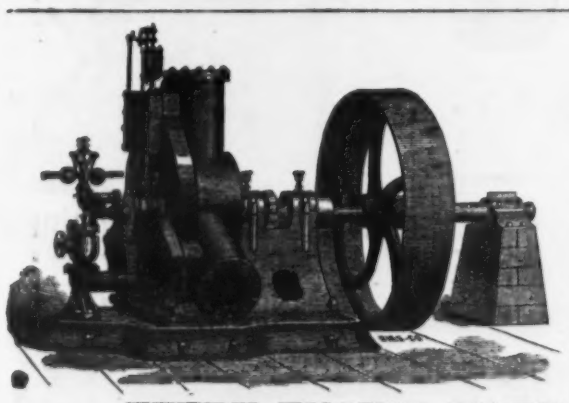

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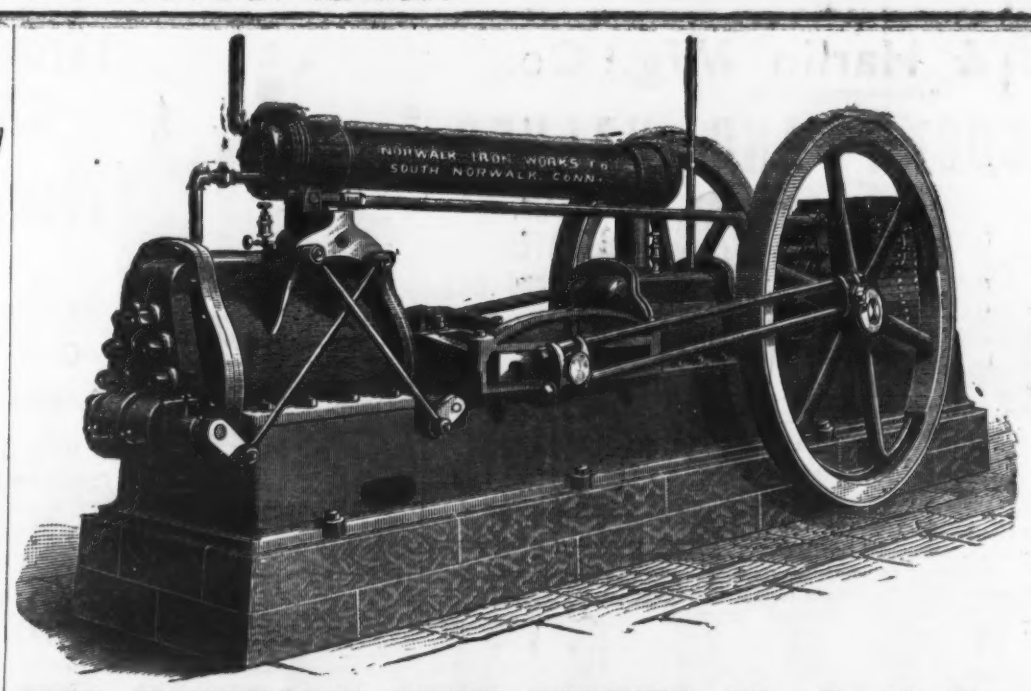

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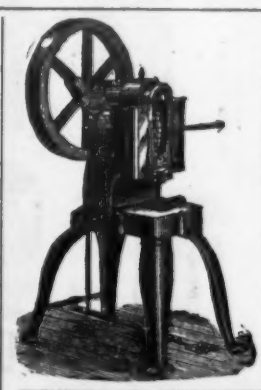

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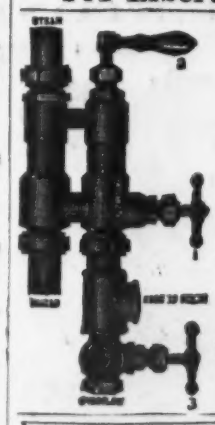

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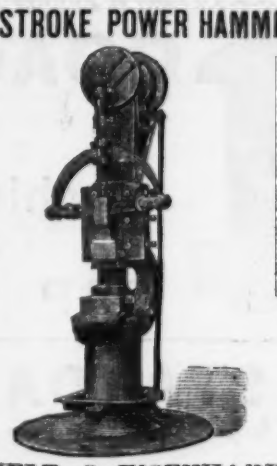

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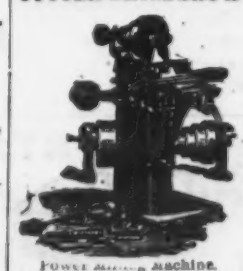

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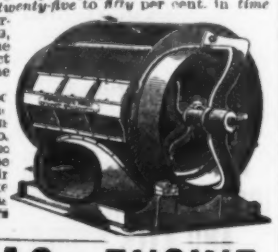

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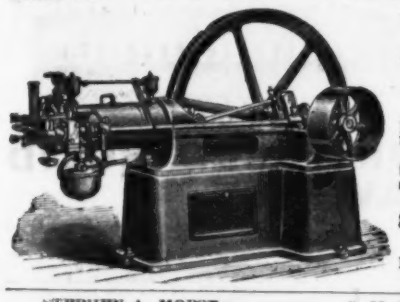

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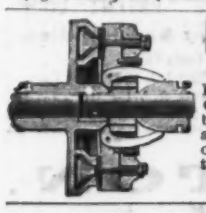

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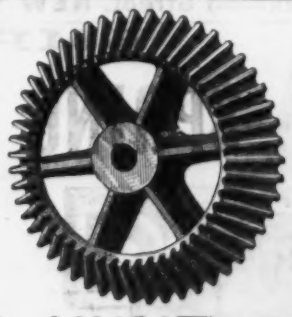

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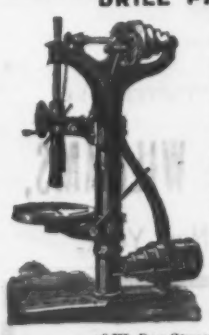

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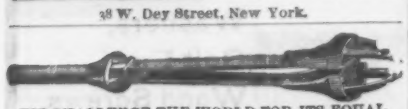

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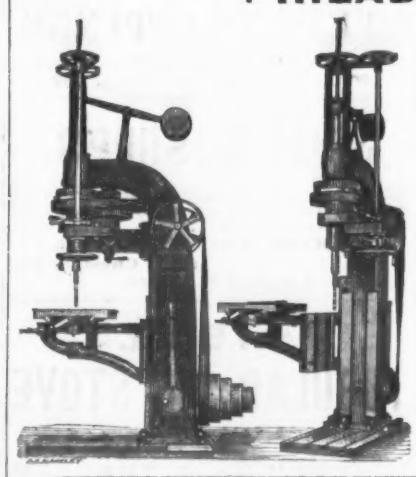

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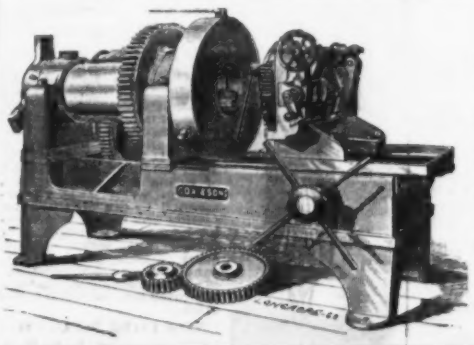

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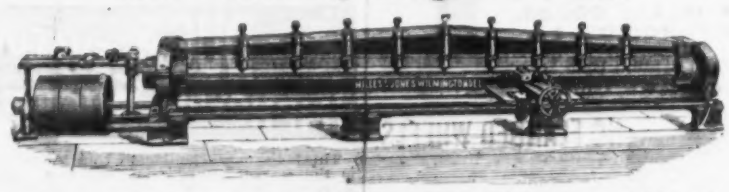

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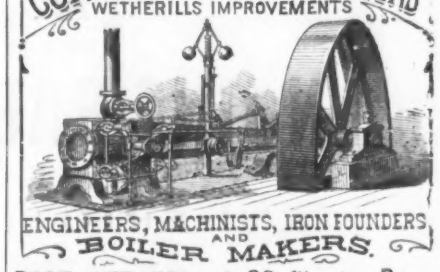

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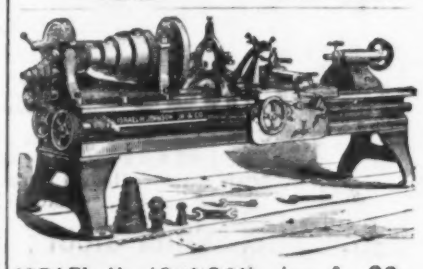

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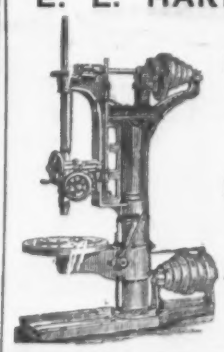

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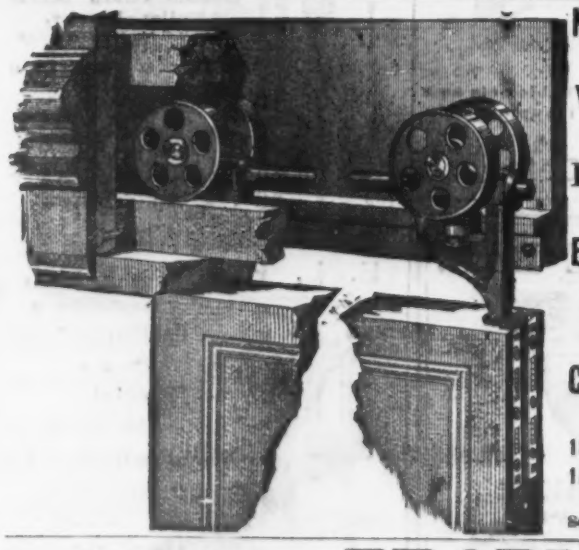

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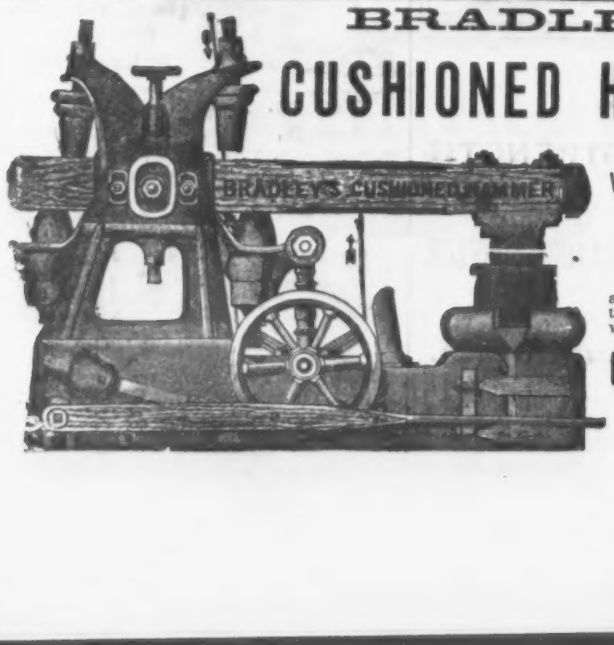

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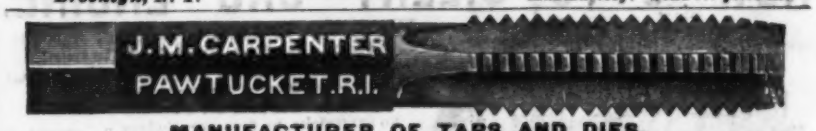

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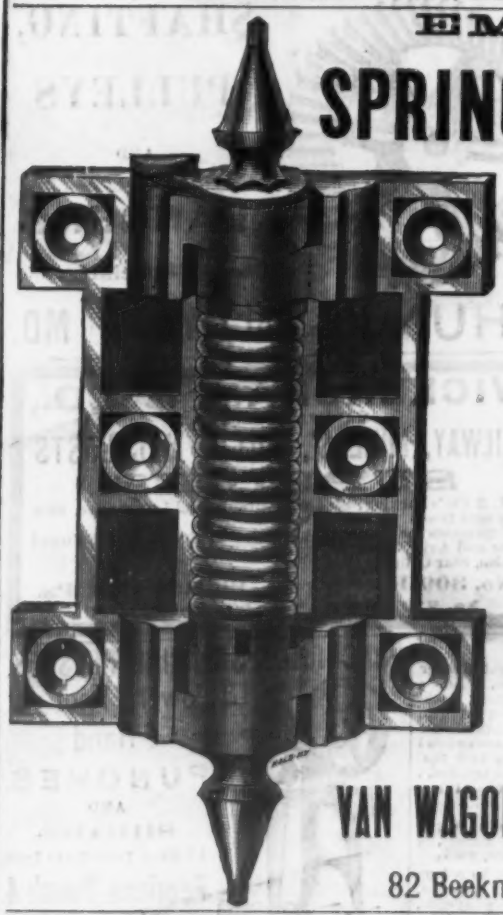

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